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A comparison of student achievement in rural schools with four and five day weeks

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A COMPARISON OF STUDENT ACHIEVEMENT IN RURAL SCHOOLS WITH FOUR AND FIVE DAY WEEKS

By

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ABSTRACT

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Student Achievement in Montana Schools with Four Day Weeks

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The purpose of this non-experimental, quantitative, causal comparative study was to examine the relationship between student achievement scores on the Montana statewide standardized assessment (MontCAS) from schools that use a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that follow a traditional five day school week. The MontCAS is the standardized assessment in reading, mathematics, and science adopted by the Montana Office of Public Instruction as a result of mandates from the No Child Left Behind Act of 2001.

In the spring of 2005, the Montana Legislature approved changes to the accreditation standards in Montana by allowing a school to be accredited based upon a total number of contact hours instead of the previous requirement of a minimum number of contact hours and a minimum number of days of instruction. Ten schools made the conversion to a four day week beginning in the 2006-2007 school year. By 2008-2009 there were 22 schools following a four day week calendar and over the next several years, this number doubled every two years. By the 2012-2013 school year, there were over 100 schools in Montana with a four day week.

Data was provided by the Montana Office of Public Instruction on every student from every school in Montana that utilized the four day school week from implementation through the 2012-2013 school year. This data was analyzed by cohort based upon the year of implementation of the four day week in addition to being considered in the composite as the number of students tested in schools with the four day week grew from just over 200 in the spring of 2007 to 2685 in the spring of 2013.

The total percentage of students identified as proficient and advanced was compared to state-wide averages disaggregated by cohort and in composite over the academic years of 2006-2007 through 2012-2013.

Findings indicate that student achievement may increase the first year of implementation of the four day week, but over time, student achievement decreases, compared to the rest of the students in the state of Montana.

DEDICATION

This body of work is dedicated to my family, who have all dealt with my time away and many missed weekends as I pursued this dissertation. My wife Chrissie, daughter Amanda, son Tyler, and German children Neele, Jonas, and Noemi all have been unbelievably supportive during this long process. It is my sincerely hope that all of my children, as well as my niece Cheyenne and nephew Nathanael will look to me and this body of work as a role model for hard work, perseverance, and pursuit of one's goals.

I would also like to further dedicate this to my first teacher, who has been my personal example for hard work, perseverance, and pursuit of goals my entire life. I love you Mom and thank you for always supporting and encouraging me.

ACKNOWLEDGEMENTS

As I look back on this process, I almost feel a sense of emptiness ahead of me as this is a process that started 13 years ago and has been such an enormous part of me for so long. When I first got to know the Educational Leadership faculty at the University of Montana, all I was interested in was what I needed for my administrative credentials. After three semesters and 36 credits, I knew that I had not only earned licensure as a K-12 Superintendent and K-12 Principal in the state of Montana, but I had obtained life-long friends and colleagues. It was a no-brainer for me to join Cohort VII a few years later and begin working on a doctoral degree so that I could continue to work with these fine educators. This group of individuals in the cohort that I spent so much time with beginning in 2005 through comprehensive exams in 2007 has also become friends and colleagues, and I am a better person for having them in my life. Thank you very much to Lynette, Sean, Cheri, Jin, Kitty, Vicki, and especially to my friend Mike for your continued support and friendship. You have meant more to me along this process than I can say in words.

I have now obtained four college degrees and consider myself unbelievably lucky to have encountered fine staff and faculty at each of the institutions I have attended. My Committee Chair, Dr. John Matt, has been phenomenally supportive and helpful every step of the way. I especially value his experience as a small-school Superintendent as he truly understood when I told him when I had time to work and when I told him I absolutely did not have time. There were many times when driving a bus or coaching a basketball game or volleyball match took precedence over research and I appreciate his understanding of my world! Dean Bobbie Evans and Professor Bill McCaw have been a constant at UM for me these past 13 years and I continue to appreciate their dedication to the art and craft. It is truly an honor to have these fine Doctors of Education as colleagues whom I can call at any time. I've never had a class from Dr. Francee O'Reilly, but I quickly learned to appreciate her insight and precision as I've moved through the dissertation process. I would have been lost sorting out the intricacies of the latest version of APA without Francee! I would like to acknowledge Dr. Merle Farrier and Dr. John Lundt, no longer a part of the UM Ed Leadership faculty, but from whom I had several memorable classes enroute to this degree.

I also would like to thank Dr. Jerry Evans from the School of Business Administration for serving on my committee. I believe that this is the first time that Mr. Dr. Evans and Mrs. Dr. Evans have served on a dissertation committee together and I'm probably unique in that I used two years of the requirement of 'continuous enrollment' to obtain my MBA degree. This addition to my knowledge base continues to serve me every day. And the timeliness of delaying my buckling down and finishing my dissertation worked out perfectly as the entire body of data for this dissertation was not available until after the spring of 2013. Sometimes it truly is better to be lucky than good!

I want to give special thanks to my friend Dave Puyear for his support and encouragement throughout this process. I can't tell you how good it feels to finally have my plane come in for its landing!

And although I thanked them in my Dedication, I would like to again acknowledge the sacrifices of my wife and children during this long process. My five kids have never known a time when I was not taking advanced coursework either over the internet, ITV, or traveling to Great Falls or Missoula on the weekends. I pray that they will forgive me for the time that I was away but appreciate the value of hard work and a goal finally achieved.

Many have asked me along the way if I intend to use this degree as a stepping stone to work in a bigger school or to teach at the college level. Neither one of these is currently on my radar, but I also don't have any idea what I want to do when I grow up. I hope I never have to, because I love what I get to do every day.

The more I learn, the more I realize how much I don't know, and that fascinates me as I strive to continually fill these gaps. Once again, thank you to everyone who has played a part in helping me to continue my pursuit of knowledge.

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CHAPTER ONE

INTRODUCTION TO THE STUDY

The traditional school year in America's public schools is approximately 180 days, which typically follows an agrarian calendar. Many in the educational field believe that the conventional school year was established to meet the needs of the 19th century farmer (Davis & Farbman, 2004); (Gold, 2002); (National Education Commission on Time and Learning, 1994). The reverse has been proposed to be the case in literature that claims that the school calendar in America was established to allow students to vacate the urban areas during the heat of the summer (Gold, 2002). Whatever the initial causes were, the calendar in the American education system is fairly consistent across all 50 states (Gold, 2002). Despite recent pushes by educational groups to add more hours to the school day and/or add days to the school year, this traditional format of a five day week for 180 days is not likely to change (Chen, et al. 2007).

Horace Mann has often been called the "Father of American education" as he served as the nation's first Secretary of Education (Cremin, 1957). In most schools, not much has changed in the past 173 years since Horace Mann (Gold, 2002). Viewing education as the "great equalizer," Mann oversaw the establishment of the first public school system in the United States in 1839 and pushed for a six-month minimum school year (Mann & Filler, 1965).

A survey by the National Center on Time and Learning indicated 28 states require 180 days of instruction, 12 with fewer days and only four—Hawaii, Kansas, Michigan and Ohio—with more. Six states determine the total hours of instruction or leave it to school boards to decide (Hardy, 2008).

To further compound the issue that schools face with time, ever-increasing monetary pressures have forced schools to consider alternative approaches. A recent study compiled by

the American Association of School Administrators found that nearly one in seven school districts is considering a four day school week as a way to combat budget short-falls (Vogt, 2008). However, there is a body of research that indicates that the projected savings is not significant (Sagness & Salzman, 1993; Webster, 2013).

Increases and decreases in the cost of energy through the 1970s and 1980s provided intermittent respite followed by budget crisis for school districts that have a significant portion of their budgets encumbered in fuel and heating costs. According to data compiled in 2007 by Xcel Energy from information from the US Department of Energy, schools in the United States spent $6 billion on energy, spending that was second only to salaries. Updated information from 2012 from the US Green Building Council, as provided by the US Department of Energy, indicated that the figure has grown to $8 billion. However, the world-wide economic crisis could ultimately prove to hurt schools even more as tax revenues decrease and the demand for tax dollars from the various state and federal agencies grows. Not since the energy crisis of the 1970s has there been so much interest in an analysis of the four day school week as a viable alternative (Kingsbury, 2008). After the crisis of 40 years ago subsided, most of the schools that went to a four day week transitioned back to the traditional calendar (Kingsbury, 2008).

Intuition would tell us that a 20% savings should be realized in certain areas of a school district budget by shifting calendars to a four day week from a five day week. Custodial, food-service, and transportation line-items should see immediate savings. Depending on building usage, there should also be savings in heating costs and possibly secretarial time. However, these costs totaled together are still a small percentage of the overall budget, because the largest part of a school budget is the salary and benefits of the professional teaching staff (AASA, 2010).

Others don't even believe that any savings is likely from a four day school week. Research conducted in Indiana indicated that a four day week "would not be likely to present significant cost savings" (Chamberlin & Plucker, 2003).

Any discussion with parents, teachers, administrators, and trustees will lead to the obvious question about how student achievement would be affected by attending school four days a week compared to five. Countless anecdotes exist from school districts that report positive results in student achievement, reduced absenteeism, and satisfaction with the four day week. There are also many studies specific to individual school districts in other states, but nothing has been done to study the impact of the four day school week in Montana on student achievement.

Lack of Consistent Research

The difficulty in conducting research on student achievement between schools on a four day week compared to a five day week was articulated by Daly and Richburg in 1984:

> Little data on student achievement has been available for evaluations. While almost all school districts have a testing program of some sort, good data is still difficult to obtain. Districts do not all use the same achievement tests, and they do not all test the same grade levels or the same subject matter areas in the same years. (p. 1)

While Daly and Richburg concluded that "the change to a four day school week has had no effect on the academic achievement of students" (p. 23), the sample sizes of 62 and 45 students were quite low which causes problems with external validity when extrapolating the data to the population. Furthermore, their research was conducted in only a few schools in Colorado, and the assessment results that were analyzed was from the Iowa Test of Basic Skills, which is no longer in use in Montana. Based on their research, they were able to conclude that

during the first year of utilizing a four day week, student growth was less the first year than the subsequent years, but within a couple years, the affect was mitigated.

Other researches corroborate the lack of research into student achievement. In 2009, The Center for Education Policy at the University of Southern Maine corroborated the work of Daly and Richburg when they concluded that "despite over 35 years of implementation, few studies have documented the impact of the four day school week" (Donis-Keller & Silvernail, 2009, p. 5).

In 2012-2013 there were over 100 schools in more than 50 school districts across Montana following a four day week format, with at least a dozen more considering it (OPI, 2013). Administrators, trustees, and patrons of these schools can work out the operational details of bus routes and extra-curricular scheduling, but they want to know what information exists regarding student achievement after conversion to a four day week, and there currently is no such data (Personal communication with Centerville Superintendent Dennis Gerke, Simms Superintendent Dave Marzolf, Dutton/Brady Superintendent D. K. Brooks, Vaughn Elementary Principal Dean Jardee).

Conflicting research in Canada demonstrated that one middle school in Alberta claimed to show poorer scores, while one study in Ontario and one in Saskatchewan claimed no negative effects, although they didn't define what these negative effects might be. As of 2003, no Canadian studies had been conducted which showed academic improvement in schools with a four day week (CUPE, 2003). Some schools in Saskatchewan and British Columbia have operated on a four day schedule for several years with one district opting to revert back to a five day schedule after six years (Taylor, 2011). However, no scientifically-based research done in Canada since 2003 on the four day school week can be located.

Purpose of the Study

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that use a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that follow a traditional five day school week. This study will provide valuable information for trustees and administrators in schools where a four day week is being considered.

Research Question

The research question that was explored in this study is: What is the difference between student achievement scores in schools that utilize a four day school week as compared to student scores in schools that follow a traditional five day schedule? There are countless concerns from trustees, teachers, parents, and patrons when a district engages in discussions of a transition to a four day week. To prepare for converting to a four day week, districts send personnel to visit other schools that have been successful where they talk to teachers and students, and discuss specifics regarding how the transition seemed to occur. However, the missing piece is empirical research that examines achievement test scores across Montana to see if there exists a difference in student performance on achievement tests.

Definitions of Key Terms

For the purposes of this investigation, the following definitions apply:

Criterion Referenced Test. A criterion referenced test is a "test or other type of assessment designed to provide a measure of performance that is interpretable in terms of a clearly defined and delimited domain of learning tasks" (Linn, Gronlund, & Davis, 2000, p. 42).

Five day (Traditional) School Week. A five day or traditional school week is one where students attend school Monday through Friday an average of six to six and one-half hours per day for a total of around 1080 hours per school year (Zaleski & Colasanti, 2008).

Four day School Week. A four day school week is the basis of a school calendar whereas the students attend school either Monday through Thursday or Tuesday through Friday. Utilization of this calendar requires that the minutes lost by reducing the number of days are spread out over the other four days resulting in a longer school day. Students attending schools using a four day week attend the same cumulative hours per year as their counterparts in a tradition setting as the State of Montana defines the school year as student attendance for a certain number of hours, not days (MCA 20-1-301).

Iowa Test of Basic Skills. The Iowa Test of Basic Skills (ITBS) is a group administered norm-referenced achievement test battery whose purpose is to provide a comprehensive assessment of student progress in major content areas (Riverside Publishing, 2010).

Norm-Referenced Test. A norm-referenced test is a "test or other type of assessment designed to provide a measure of performance that is interpretable in terms of an individual's relative standing in some known group" (Linn, Gronlund, & Davis, 2000, p. 42). A norm referenced test is one where scores are distributed along a normal bell-curve with 68% of the scores lying within plus or minus one standard deviation of the mean, 95% of the scores lie within two standard deviations of the mean, and 99.7% of the scores lie within three standard deviations of the mean (Gay & Airaisian, 2003).

MontCAS. MontCAS stands for the "Montana Comprehensive Assessment System, which includes a criterion referenced test" as well as other individualized components (OPI, 2012). For the purposes of this study, MontCAS will be used to refer to the criterion referenced

test previously given to Montana public school students in grades 3-8 and grade 10 in the spring from 2007 through 2013. The math and reading portion was given to all of the students in grades 3-8 and 10 all of those years while the science portion was only given to students in grades 4, 8, and 10 from 2008-2013.

Rural School in Montana. Montana Code defines an elementary school district as being either first, second, or third class according to the population of the area served by the district. A first class district has a population of 6,500 or more, a second class district has a population more than 1,000 but less than 6,500, and a third class district has a population of less than 1,000. The classification of a high school district must be the same as the elementary district where the high school building is located (MCA 20-6-201 and MCA 20-6-301). For the purposes of this study, a rural school in Montana will be a third class district as defined in Montana Law.

Rural Schools in the United States. Rural, for the purposes of this dissertation is defined by those school districts that according to the Economic Research Service Rural-Urban Continuum Code, which is sometimes referred to as the Beale code, are assigned a locale code of seven or eight. The Beale code assigns numbers one through nine to every school district in the country with a "1" representing a county in a metro area with a population of 1 million or more and a "9" representing a completely rural area with a population of less than 2,500 and not adjacent to a metro area (Department of Education, 2012).

Even with the above definitions of rural from Montana law and the National Center for Educational Statistics, it is difficult to quantify and accurately define what it truly means to be in rural Montana. Another more common way to express rural is by athletic classifications as determined by the Montana High School Association. The MHSA separates Montana high schools into four classifications, AA, A, B, and C. Class AA schools are those that have an

enrollment over 826, Class A schools have an enrollment between 340 and 825, Class B schools have an enrollment between 120 and 339, and Class C schools have an enrollment less than 119 (MHSA Handbook, 2013). For the 2013-2014 academic year, there are 104 Class C schools in Montana participating in high school basketball, but these schools only make up 88 teams (MHSA Handbook 2013). The difference between these two numbers represents the number of very small schools that are forced into athletic cooperatives to field sports teams because in many schools, the numbers of students aren't sufficient to field teams without joining with a school down the road.

The Rural Assistance Center further describes the difficulty in determining what it means to be rural.

> Rural is an inexact term that can mean different things to different people. For example, what is considered rural in a state with low population density, like Montana, may not resemble what is considered rural in a state with a much higher density, like Massachusetts. However, for specific purposes there is a need for exact definitions of what is meant by "rural." (http://www.raconline.org/topics/what-is-rural/faqs/#principal)

For the purposes of this research, the general term 'rural' will apply to those school districts that are identified as having a Beale locale code of seven or eight. In Montana, there are no districts identified as a '1' or '9' using this methodology, but there are 349 out of 418 with a locale code of '7' or '8' which represents 83.5% of the districts in Montana (Department of Education, 2012). Almost every one of the districts with the Beale code of seven or eight in Montana are class 3 schools as defined by Montana law and are all either Class B or Class C schools as defined by the Montana High School Association.

School. A school in Montana is a legal entity with its own unique school code assigned by the Office of Public Instruction. In Montana there are many different grade combinations that make up each of these schools. Most of the time, students who are part of a 'school' all attend school at the same building location. However, there are rare instances where there are attendance centers away from the primary building which is considered the 'school'. For example, Hutterite Colony students at Birch Creek and Pondera Colonies in rural Pondera County attend school in attendance centers at their colony but are considered to be students of Dutton/Brady Elementary School. Common grade configurations for schools in the rural setting are K-6, 7-8, K-8, 9-12, and K-12. In larger towns, it is not uncommon to have schools that are K-1, 2-3, K-3, 4-6 or other combinations. For all but a very few exceptions, a 'school' can be interpreted to be an individual school building (OPI, 2011).

School District. A school district is a governmental unit organized to provide public education for either K-8 students or 9-12 students depending on if it is an elementary or high school district. A school district typically has several schools underneath the legal entity number of the district. School districts in Montana are overseen by an elected board of trustees who either hire a superintendent for general supervision or in the case of very small and rural districts; they rely upon the elected County Superintendent to provide for supervision.

Delimitations of the Study

Creswell (2003) stated that the research should "use delimitations to narrow the scope of the study" (p. 148). This study is delimited in that it will focus on only Montana students and will utilize one measure of student achievement, the MontCAS.

Another delimitation is that the MontCAS only assesses students in grades 4-8 and 10. This elimination of the primary grades and upper high school grades may affect other relevant

measures of students in four day week schools such as graduation rates and post-secondary success.

Limitations of the Study

Limitations identify potential weaknesses of the study (Creswell, 2003). Montana has a broad public school system made up of over 400 different school districts with locally hired administrators and locally elected trustees. Every school district that has gone to a four day week has created its own unique path toward the four day week and each of these paths resulted in the same conclusion that a four day week was best for their school. Varying levels of community involvement pre-implementation, teacher in-service training during and post-implementation, and the relative size and relative rural nature of schools across Montana may decrease the generalizability of findings to other schools and school districts.

A further limitation of this study is that the MontCAS is a singular measurement at a single point in time. However, the standardized test has a long tradition of use in America to allow for comparison of students in different schools, districts, and states.

Significance of the Study

This study was particularly timely in that the number of schools across Montana that have either changed to a four day week system or considering changing to a four day week is increasing at a dramatic rate (OPI, 2009, 2011, 2013). Since the 2005 Montana Legislature amended the law (MCA, 20-1-301) to allow for aggregate hours instead of a minimum number of days, the number of schools utilizing this flexibility has doubled every two years. In 2006-07, ten schools adopted a four day schedule. By 2008-09, there were 22 schools utilizing a four day calendar (OPI, 2009). Just two years later, that number increased to 48 schools (OPI, 2011) and from 2011 to 2013, that number more than doubled as there were over 100 schools in 2012-2013

utilizing a four day week schedule (OPI, 2013). Even as this dissertation was being finished during the 2013-2014 academic year, administrators from additional schools (Noxon and Nashua) and newspapers in the region (Choteau Acantha) were in contact seeking information about student achievement in the four day school week. Furthermore, one school that has been utilizing the four day week (Dutton/Brady) has inquired about the results of this research as they consider whether or not to continue operating under their current schedule.

The results of this research should prove to be beneficial as more schools continue to seek ways to best provide education for students as the districts face declining enrollments which then results in declining funding from the state and a smaller budget authority for local levies. The change to MCA 20-1-301 granted schools the flexibility to operate with a four day school week, but the findings and conclusions outlined in Chapter 4 and Chapter 5 will give administrators, trustees, and communities reason to rethink this approach as a solution to funding difficulties. It will be very important for anyone considering implementation of a four day week to seriously consider the impacts that have been documented and develop a plan ahead of time to mitigate these results.

Summary

As rural schools in Montana make the change to a four day week, other surrounding schools ask questions about how it is working. Hearing about the positive aspects, others are exploring the concept. This is creating the proverbial snowball effect, but at the same time there are many unanswered questions. This research will determine if student achievement is affected by making the change from a traditional five day week to one where students attend four days.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this non-experimental, quantitative, causal comparative study will be to study the relationship between student achievement scores on the MontCAS assessment from schools that use a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that follow a traditional five day school week. The review of the literature consisted of a number of opinion pieces written from two opposing points of view about the success of the four day week system. There are countless opposition pieces written by columnists and educators who decry the reduction of class time, concerns about the longer school day for children, and the lack of day-care for working families. On the other side of the debate, there is very little peer-reviewed research concerning student-achievement in schools that have made the transition from a traditional school week to a four day week (Donis-Keller & Silvernail, 2009; Ryan, 2009; Gaines, 2008). It is the goal of this dissertation to provide this missing link to the ongoing discussion.

John Creswell (2003) suggested that "when abstracting non-empirical studies, the researcher should: mention the problem, indentify the central theme of the study, state the major conclusions related to the theme, and mention flaws in reasoning, logic, and forces of argument" (p. 42). With that thought in mind, the very limited research performed on four day school weeks primarily consisted of research briefs, research papers, and compilations of anecdotal data along with research that has significant flaws centered primarily around the very small sample sizes.

Creswell (2003) discussed that organization is key to performing a literature review and that it needs to be organized through the creation of a "literature map". Specifically, Creswell

(2003) described a model that is "composed of circles with each circle representing a body of literature and the intersection of the circles indicating the place at which future research is needed" (p. 39). This particular strategy proved to be most useful in identifying two primary concerns with the research found. These problems were that a great deal of the research that exists was not peer-reviewed and due to inadequate sample sizes cannot be generalized to a larger population. Furthermore, this method reveals that the most significant missing piece in the discussion of the four day school week is any scientifically based and peer reviewed study that focused on student achievement.

The sections that follow will include the history of the four day school week, the timeline of its expansion across the United States, a summary of the limited research in student achievement that exists along with critiques on their deficiencies, information on how schools are measured in Montana with a variety of assessments, information reported by Montana schools as to why they made the conversion to a four day week, research that exists on the cost-savings and impacts on other aspects of the school when a four day week is implemented, and finally information on how schools are assessed by the state and federal government.

History of the Four day School Week in America and Montana

This section will examine the origins of the four day school week and chart its growth since 2005. While conducting this review, data were sought from nation-wide and state-level educational organizations including the National Conference of State Legislatures, the Education Commission of the States, Northwest Regional Educational Laboratory, Southern Educational Research Board, Mid-continent Research for Education and Learning (McREL), and many state agencies including the Colorado Department of Education and the Montana Office of Public Instruction.

The first school to experiment with an alternative to the traditional five day per week school year consisting of four nine-week quarters is in Madison, South Dakota, where they made the change in 1931 (Blankenship, 1984). Research conducted by the University of Southern Maine also confirms this initial use of the four day week in South Dakota in the 1930s, but the first significant wave of popularity across the country didn't take place until the early 1970s in Maine and New Mexico (Donis-Keller & Silvernail, 2009; Ryan, 2009).

Montana's accredited schools were not allowed to implement a four day school week until Senate Bill 170 passed the 2005 legislative session. This bill changed state law to define a school year in terms of hours instead of days (MCA, 20-1-301). The law was changed to say that the minimum aggregate hours of class instruction for students in grades 4-12 shall be 1080. Since that time, over 100 schools in Montana are now utilizing a four day school week (OPI, 2013).

All available research confirms that the four day school week is used mostly in small and rural schools mostly in the western part of the United States and every school in Montana that utilizes a four day week fits the definition of rural established in Chapter 2 (OPI, 2013). The reason for this connection between rural areas and the interest in the four day week is rooted in the dramatic increase in fuel prices in the early 1970s. This caused significant budget difficulties for schools, and they looked for any way to reduce expenses. By adding time to each of the other four days of the week, schools found that they could reduce transportation expenses and the amount spent on utilities (Ryan, 2009; Donis-Keller & Silvernail, 2009; Anderson & Walker, 2012; Chamberlin & Plucker, 2003; Gaines, 2008; Dam, 2006; Sagness & Salzman, 1993).

In Montana, the schools utilizing the four day week are primarily small rural entities. In fact, a majority of the schools are so small that they are overseen by a county superintendent.

This occurs when the school district is so small that employment of a district superintendent of principal would not be fiscally reasonable. The duties of this elected, and sometimes part-time, position include general supervision of the school, observation of teaching staff, and discipline of students (MCA, 20-3-207). The largest school operating on a four day week in 2001 was Arlee Elementary, with a student population of 224 (OPI, 2011). In 2013, the largest school utilizing a four day week was Northside Elementary in Wolf Point, Montana. Northside serves grades 4-6 and had an enrollment of 183 (http://gems.opi.mt.gov/SitePages/SchoolInfo.aspx?schoolID=1022).

During the early 1970s, several districts in Massachusetts and New Jersey experimented with the four day week, but returned to a traditional schedule when budget pressure lessened (Feaster, 2002). At the same time, Maine Administrative School District 3 began to experiment with the four day week as a reaction to a vote by local tax-payers to reduce operating funds by 10%. After three years, the cost savings was documented but the energy concerns lessened and the district returned to the traditional five day week (Roeth, 1985).

In Montana, from 2009 to 2011, only two school districts out of the twenty-one chose to return to a five day week. These two schools are the very small Trail Creek Elementary in Custer County and Gold Creek Elementary in Powell County which only have 5-7 students in a given year. Two years later, these schools reverted back to the four day school week which is how they currently operate in 2013. At the same time, there were an additional 15 districts making the change to a four day week. Analysis indicates that whatever the reasons might be, the vast majority of schools in Montana that make the change to the four day week stay with this format.

History of the Four Day School Week in Canada

The four day week has not only seen a growth in interest in the rural United States, but has also caught on in Canada. Similar concerns with the education funding have hit rural areas in Canadian provinces, and the pressure to make ends meet with frozen budgets has resulted in changes north of the border.

The first Canadian school to experiment with the four day week was in Milo, Alberta, which made the change in 1994 in an attempt to reduce transportation costs (Milo School, 2013). A desire to reduce transportation costs was also the reason that four other school districts in the province followed suit within the next few years. However, one school returned to a traditional week after less than two years. Citing research conducted at one of the middle schools, "achievement test results appear to indicate growth in learning is below rates expected for the test periods" (Marshall, 1995, pA6).

Beginning with the 2002-2003 school year, Boundary School District #51 in British Columbia became the first school in British Columbia to change to a four day week (Steffenhagen, 2003). The impetus at the time was a freeze in funding and simultaneous increases in the cost of benefits to employees.

Early in the decision to convert to a four day week, the Boundary School District chair claimed a 20% savings in custodial and transportation amounting to $210,000 a year (CUPE Research, 2003). Furthermore, the district made the claim that the savings from going to a four day week was spent on enhanced literacy programs to improve student achievement (School District 51). But at the same time, the local provincial union president issued a statement saying, "We need always to ask first how it will affect the students." This sentiment was echoed by the

local school union president who said, “Not all the proof is in. We need academic proof that achievement has not been compromised” (CUPE Research, 2003, p. 3).

Similar stories are echoed across Saskatchewan where the rural Scenic Valley School Division went to a four day week in 1996, resulting in savings of about 2% of the school’s budget. As the vast majority of schools that consider a four day week are in rural settings, it is interesting to note that the very small Scenic Valley School Division no longer even exists today, having been amalgamated into the newly created Aspen Grove School Division in 2004 (CUPE, 2005). Resistance continues in relatively larger districts where the four day school week has been rejected in Saskatoon and Regina (CUPE, 2003).

Timeline of Growth of the Four day School Week

While a relatively new phenomenon in Montana, the history of the four day school week originated over eight decades ago with the first documented case being in Madison, South Dakota in 1931 (Ryan, 2009; Blankenship, 1984). No documentation was found about any growth or additional schools going to a four day week for the next forty years until the Cimarron School District in New Mexico switched. This district has the distinction of having the longest consistent use of the four day week in the US starting in 1973 due to the energy crisis and continuing to today. A review of their school calendar on the district website and emails with the current superintendent confirmed that the school is still using the four day week (Cimarron Municipal Schools, 2012) (Superintendent J. Gallegos, personal communication, November 19, 2012). Cimarron has not conducted any formalized research on their own student achievement, but the four day week has become so ingrained in their culture that the four day week is now considered the norm.

During the 1970s and 1980s, the number of schools converting slowly increased to a total of 100 districts in ten states by 1987 (Grau & Shaughnessy, 1987). The gradual growth continued into the 21st century as in 2009 there were reportedly 120 districts in 17 states utilizing the four day week (Ryan, 2009; Donis-Keller & Silvernail, 2009).

Through the early 2000s, several states considered legislation that would have allowed for a four day week, but for various reasons, the state legislators did not pass legislation that would have allowed this to occur. These states included: Alabama, Florida, Illinois, Indiana, Iowa, Maine, and Missouri. At the same time, there were several states that passed legislation to allow for a four day week: Georgia, North Carolina, Oklahoma, and Washington (Donis-Keller & Silvernail, 2009).

By 2011, a total of 292 districts nationwide in 21 states utilized a four day school week in Arizona, California, Colorado, Georgia, Idaho, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Montana, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Utah, Wisconsin, and Wyoming (OPI, 2011). Out of the 292 districts, 32 of them (11%) were in Montana (OPI, 2011). At the same time, several states have laws on the books that allow using four day week but have no schools using it: Arkansas, Delaware, Pennsylvania, New Hampshire, Virginia, and Washington (Layton, 2011).

In Wyoming during the 2009-10 school year, there were nine out of 48 school districts (23 out of 326 schools) with a four day week. At the same time, in South Dakota, there were twenty-one out of 156 districts using a four day week while Colorado had 62 out of 178 school districts using the four day week (OPI, 2011).

Advocate for the Four Day School Week from Oregon

One of the most outspoken advocates for the four day school week in the United States is Dr. Donald L. Kordosky. He freely acknowledges that he was personally opposed to the four day week under the assumption that children could not possibly learn as much in four days as they do in five (Kordosky, 2011).

In his self-published book, Dr. Kordosky explains how he made his personal transformation from an opponent to an advocate of the four day week. He does an excellent job in citing a great deal of anecdotal findings in his own experiences in Oakridge School District in Oregon. His book discussed improved employee morale, reduced teacher turnover, a decline in student discipline, and other reasons for a conversion from the traditional five day week to the four day alternative. More importantly, he references a number of seminal four day week researchers who were also studied for this dissertation to justify his conclusions.

Kordosky also freely acknowledged the negative attributes commonly used in arguments against adopting a four day week throughout Chapter Two of his book. These include child care on Fridays, food for students on Fridays, concerns that the day will be too long for younger students, fear of crime increasing when students are out of school, concern that the number of hours of instruction will decrease, and loss of work hours for classified staff. Kordosky successfully explained that many of these concerns don't come to fruition in schools that have made the conversion.

The balance of Kordosky's work is a book that can serve as a "how-to" primer for the school district considering a change to a four day week including sections on how to work with certified and classified staff contracts, scheduling activities, working with the teachers' union, and a planning calendar for discussion and implementation. The key component in the book that

Kordosky articulately described is, when properly done, there can be more student seat-time in a well-structured four day week schedule than the traditional five day week, which is the point he is making with the name of his book: The Four-Day School Week: Less IS More.

However, while Kordosky demonstrated that students, teachers, staff, community, and parents can all be very happy with a four day week schedule, he acknowledged briefly on the second page of Chapter One that while the research indicates that there doesn't appear to be any reduction in student performance, there may not be any ongoing academic improvement.

> Some districts that implement the four day week see substantial gains in student academic performance that are quite substantial initially. Typically the large academic gains that occur during the first year or two of implementation of a four day week are not sustained, as the initial gains experience a ceiling effect (Mitchell, 2006). Other districts experienced no substantial changes in academic performance when comparing outcomes from the four day school week calendar and the five day school week calendar (Daly & Richburg, 1984).

Dr. David Kordosky is only one of two administrators in Oregon who has been awarded the Distinguished Administrator Certificate from the Oregon Teacher Standards and Practices Commission and there is no doubt that he is a passionate and dedicated advocate for public education.

An Overview of Research Concerning Student Achievement

While an internet Google search of "four day school week" will generate over a billion links to articles written in recent years about the four day school week, a comprehensive review of the literature demonstrated very few scientifically-based and peer-reviewed studies. The majority of these are opinions and editorial pieces and are either over 20 years old or due to

small sample sizes cannot be generalized to apply to the recent interest and expansion of schools in Montana who are considering a four day school week.

The Colorado Department of Education has been facilitating a number of studies for several years while most other research has been compiled by a variety of educational consortiums. In Colorado, over 30% of the school districts operate on a four day week, which explains the state's interest (Anderson & Walker, 2012). Since Montana law allowed the four day week in 2005, the Montana Office of Public Instruction has released two 'Four day School Week' reports with a compilation of open-ended questions from participating schools in 2009 and 2011.

The Colorado Department of Education conducted a study of the 62 school districts with 21,430 students who attended school following a four day school week calendar during the 2006-2007 school year. There were a total of 178 school districts in Colorado in 2006-2007 consisting of 780,708 students. This means that while 35% of the schools in Colorado were using a four day week, it included only 2.7% of the students in the state. The sizes of the 62 schools in the study range from 8 to 1265. These small numbers of students further demonstrates that the four day week is primarily a rural school phenomenon. This study highlighted several aspects of the four day week but reached no conclusion about student achievement.

> The jury is out on the question of student performance. If performance is measured by standardized test scores, only one study has been completed comparing districts. It was conducted in the early 1980s by Colorado State University. The results were inconclusive, but were confounded by research conditions. The general feeling is that students do no worse on the four day week than on the traditional schedule. (Dam, 2006, p. 8)

In the 1980s, Dr. Joseph Daly and Dr. Robert Richburg, from Colorado State University, received a grant from the Colorado Department of Education and the US Department of Education to study student achievement in schools utilizing the four day week. They looked at five rural Colorado schools for four years, analyzing their ITBS scores. The conclusion was that "the change to a four day school week had no effect on student academic achievement; although there was a suggestion that there might be some leveling of performance during the first year the schools were on the four day schedule" (Daly & Richburg, 1984). Daly and Richburg accurately cite the primary problem with research on the four day week. This lack of pre-conversion followed by post-conversion data makes it difficult for researchers to obtain accurate longitudinal data.

> When school districts made the decision to go to a four day week, they did so in order to address major needs of the district and not as an experiment to provide research data on student achievement. As a result, attempts to obtain good longitudinal achievement data on a group of the same students or data on the same grade level over a number of successive years comes after the fact. (p. 2)

Daly and Richburg further cite the difficulty in making any conclusions due to the fact that not all schools use the same achievement tests and they were not administered consistently across the grade levels. Another significant deficiency in the Daly and Richburg research is their extremely small sample size of only five rural schools and just 107 students. A positive aspect of this research is that it was a four year longitudinal study, but still was very limited.

During the same time period, Robert Richburg and Douglass Sjogren authored *The Four Day Week—What are the Advantages for Schools?* Their analysis of twelve Colorado school districts suggested that a four day week seemed to offer several benefits including savings in fuel

expenses, decreased absenteeism, improved efficiency in activity-oriented classes such as lab-based courses, increased staff development time, and a flexible 'fifth-day' for extra-curricular activities (Richburg & Sjogren, 1983).

Another study done in 1987 by Grau and Shaughnessy in New Mexico concluded that "there have been no declines in students' academic achievement." This research also is longitudinal (1982-1986) and utilizes the state-administered Comprehensive Test of Basic Skills. However, the research is deficient in that achievement scores from students in only ten rural schools were analyzed. At the time of the study, in 1987, Grau and Shaughnessy note that approximately 100 schools in ten states were using some form of a four day school week. The researchers do note many of the same benefits seem to be apparent that others have mentioned including reducing utility expenses, reducing costs for substitute teachers, reductions in student and teacher absenteeism, and use of the fifth day for extra-curricular activities.

Why Have Montana Schools Made the Change to a Four Day Week?

In 2009 and 2011, the Montana Office of Public Instruction compiled information from the schools across the state which had made the conversion to a four day week schedule. The 2009 survey was sent to 19 school districts and had 17 districts respond. The 2011 survey went to 32 districts and all responded. The schools that responded in 2009 reported that they hoped to see cost savings, and indeed they did experience savings—but it was qualified with comments that the savings wasn't as much as they would have hoped (OPI, 2009). The 2011 survey results indicated that the cost savings to the district wasn't as important in the larger pool of schools, but that families experienced savings due to less days having to drive to school for those who live a long way from school (OPI, 2009 and 2011).

A perceived problem that has come up in many districts considering a change to a four day week is child care (Kordosky, 2011). Overwhelmingly, this concern did not come to fruition, but there were still sporadic circumstances where child care was an issue. It was noted that while many child care providers might shut down on the Friday, another pool of babysitters became available due to the fact that high school wasn't in session (Kordosky, 2011). Another perceived problem regarding the length of the day for elementary students also didn't appear to be an issue in districts that made the change to a four day week (OPI, 2009 and 2011).

Many districts reported very favorable responses from parents as they were able to schedule doctor appointments and other family trips thus avoiding missed school time. Districts also reported that teacher and student absenteeism decreased as both staff and students scheduled time away from school on the Fridays (Kordosky, 2011); (OPI, 2009 and 2011).

When asked how districts utilized the fifth day each week, a majority reported that the Fridays were used for staff development, additional tutoring, field trips, make-up days, and other extra-curricular activities (OPI 2009 and 2011). A number of districts have a combination of use of these Fridays as professional development time, tutoring time, or days when the schools are closed (OPI 2009 & 2011). Schools also responded favorably to the longer day in that they found it beneficial to have more uninterrupted instructional time that provided for more flexibility for block scheduling (OPI, 2011).

Lack of Research but Advantages Claimed

Many schools across the country have creatively spun their four day week as a positive for student achievement. Webster County Schools was the first district in Kentucky to go to a four day week and they claim that it has been successful. "Webster County School System has had tremendous success with our 4 day school week. Not only have we lowered our budget, but

we have provided many benefits to the students, and staff of Webster County" (Webster County Schools, 2013). Since this change in 2003, they cite longer instructional time blocks, reduction in student and teacher absenteeism, improved morale, and a decrease in student discipline infractions (Webster County Schools, 2013). But nowhere is there any data to show any impact on Webster's student achievement.

Similar problems are seen in Montana in that districts claim success but can't prove it. Many Montana schools report that test scores have improved and GPAs have also gone up while they also self-report that there hasn't been a change in academic performance of students (OPI 2009 and 2011).

How Schools and Students in Montana are Assessed by the State and Federal Government

Public Law 107-110, otherwise known as the *No Child Left Behind Act of 2001* is an extension of the Elementary and Secondary Education Act of 1965, which governs the funding and usage of a wide variety of federal funds distributed to public schools in the United States (Public Law 107–110—Jan. 8, 2002 115 Stat. 1443).

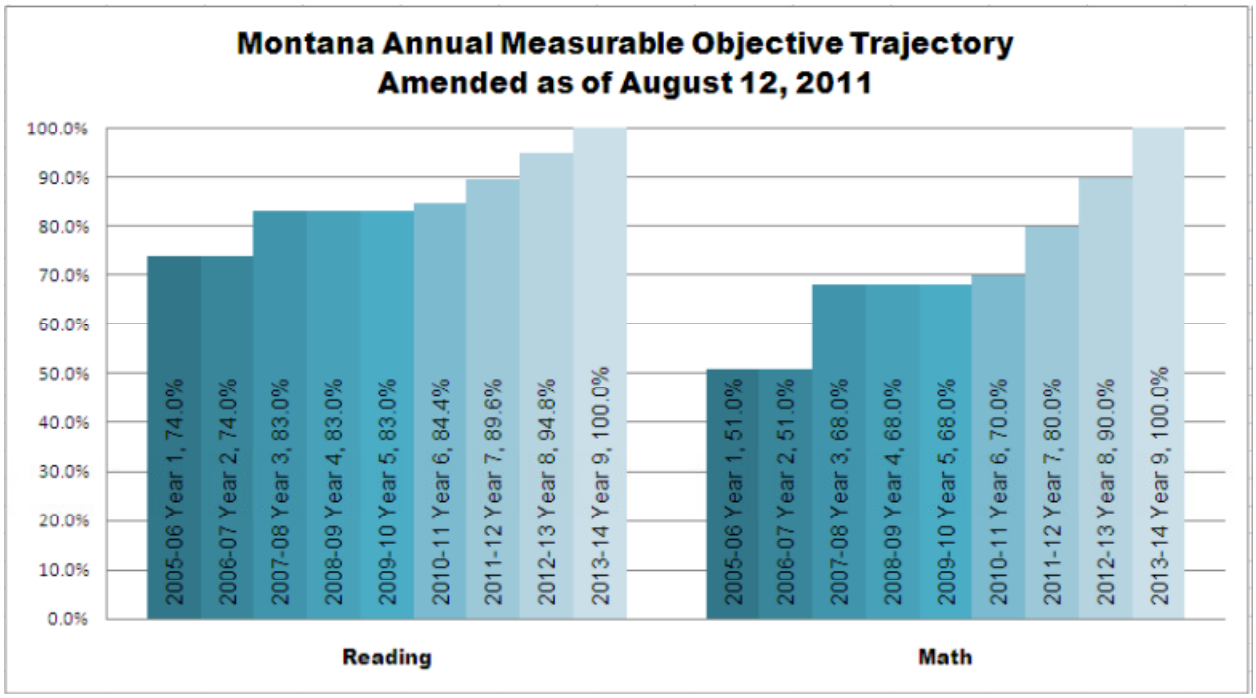
This law mandates that:

> each State… shall demonstrate, based on academic assessments…what constitutes adequate yearly progress of the State, and of all public elementary schools, secondary schools, and local educational agencies in the State, toward enabling all public elementary school and secondary school students to meet the State's student academic achievement standards…adequate yearly progress shall be defined by the State in a manner that applies the same high standards of academic achievement to all public elementary school and secondary school students in the State and that is statistically valid and reliable. (Public Law 107–110—Jan. 8, 2002 115 Stat. 1443)

In Montana, the measurement tool used to determine Adequate Yearly Progress (AYP) is a component of the Montana Comprehensive Assessment System (MontCAS). Where-as MontCAS includes a Criterion-Referenced Test, a Criterion-Referenced Test-Alternate, an English Language Proficiency Test, and the ACT Plus Writing assessments, the actual AYP determination relies on the Criterion-Referenced Test (CRT). The CRT administered to Montana's students has been developed by Measured Progress, a company based in New Hampshire, which contracts with seventeen states to provide assessments developed to be in alignment with their respective states' standards. Over 80,000 Montana school children in grades 3-8 and grade 10 are tested annually in reading and mathematics. Each child's result is then classified in one of four categories: novice, nearing proficiency, proficient, or advanced.

To meet the requirement of PL 107-110, the Montana Office of Public Instruction has adopted criteria where a certain percentage of students, and those in every sub-group, must be at least proficient, as measured by the MontCAS CRT in order for the school and district to make AYP. The number of sub-groups identified is extensive and includes gender, race, ethnicity, qualifications for special education services, qualification for section 504 of the American's with Disabilities Act, poverty status, and homelessness. In accordance with the expectations of No Child Left Behind, all students are expected to test as at least "proficient" by 2014. Figure 1 shows the required levels of performance expected by schools each year in order to meet the requirement of adequate yearly progress. A school that has a higher percentage of students and all sub-groups of students, meeting these Annual Measureable Objectives (AMOs) than indicated in the chart is considered made AYP.

Figure 1



(From the Adequate Yearly Progress Manual 2011-12—Montana Office of Public Instruction)

Summary of Research Concerning other Impacts of the Four Day Week

Although this research is focused on student achievement, many other cited impacts have been documented in schools that switch to a four day week. A great deal of speculation exists in the available literature as to what, if any, affect these other impacts may have on student achievement.

As has been previously stated, the primary reason that schools have considered going to a four day school week has been to save money. One study reported that the switch to four days resulted in energy savings between seven and twenty-five percent (Richburg & Sjogren, 1983). Since energy is just one part of the overall budget, this impact that this savings has on the entire budget is much smaller. This was found in Shelley School District in Idaho, where the net savings was only 1.6% of the total budget, or $46,100 (Sagness & Salzman, 1993). Schools that

have made the switch to a four day week have reported improved student and teacher attendance in reduced absenteeism under the four day week schedule, but no research exists that analyzes this potential link to achievement (Anderson & Walker, 2012; OPI 2009; OPI 2013; Ryan, 2009; Sagness & Salzman, 1993). Furthermore, all information regarding reduced absenteeism is only anecdotal in nature as no data on absenteeism has ever been reported by a school that has changed to a four day week, thus no research has been done on this potential link to achievement.

Another advantage claimed is the benefit of increased time for extra-curricular travel for athletes who would normally miss time on Friday for travel to games, if these are scheduled on the fifth day. Some schools use this fifth day for additional tutoring, professional development for teachers, and miscellaneous enrichment activities (Anderson & Walker, 2012; Blankenship, 1984; Dam, 2006; Feaster, 2002; Hale, 2007; OPI, 2009; OPI, 2011; Ryan 2009).

Summary

Passionate arguments abound on both sides of the issue of whether a four day week is better or worse than a traditional school schedule. When one examines the research, the same relatively short list of seminal researchers continues to be cited repeatedly throughout the literature. Analyses of the available research typically return to the same conclusion that student achievement is not likely to be negatively impacted. However, the weaknesses of much of the available research have been noted, as well.

The pros and cons of the four day school week will continue to be debated among administrators, parents, and policy-makers. This study was designed to provide quantitative data compiled from all of Montana's schools that have made the conversion to a four day week.

CHAPTER THREE

METHODOLOGY

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that used a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that followed a traditional five day school week. Chapter three describes the research methodology utilized, information about the population of students whose scores were analyzed, as well as the process of collecting the data.

Research Design

Kothari (1990) described Ex post facto research as a research method where the "researcher has no control over the variables; he can only report what has happened" (p. 3). Ex post facto is Latin for "after the fact." This type of research is also known as a causal-comparative study. Causal-comparative research is a non-experimental research design which attempts to identify associations among variables which may or may not use pre-existing (ex post facto) data (Fraenkel, Wallen, Hyun, 2011). Fraenkel states that "causal-comparative research attempts to determine the cause or consequences of differences that already exist between or among groups of individuals." Gay and Airasian (2003) tell us that two groups of the population should be determined with respect to a given independent variable. In this case, the variable is if the student attended school in a district utilizing the four day school week. Data from every student tested using the MontCAS who attended school in a four day week setting were compiled and compared to the results of the entire student population tested in Montana. The data that was collected to analyze the two groups is the relative student achievement on the MontCAS tests in mathematics, reading, and science.

In this study, the difference that already existed is that some students in Montana have been attending schools utilizing the four day school week while the remainder of the students attend schools in traditional five day week formats. There is a threat to internal validity due to the possibility of selection bias in the choosing of participants (Fraenkel, Wallen, Hyun, 2011); Gay & Airasian, 2003). But this will not be a problem as data was gathered from every student tested in Montana in a given year, thus negating any selection bias. To further explore potential differences that could exist in schools that have utilized the four day week longer than others, data were disaggregated to analyze schools that have used the four day format for less than four years and from between five and seven years. There are no Montana schools that have utilized a four day week for longer than seven years, as it was in 2005 that the state legislature first allowed for this different model of instruction. The original ten schools that first made the change in 2006-2007 are only now in their eighth year of implementation in 2013-2014. Larger schools, schools that have more than 25 students tested, also were analyzed for patterns of student achievement in the years after the four day week was adopted.

Appropriateness of Research Methodology

A causal-comparative methodology is appropriate to use for this research as "the basic causal-comparative design involves selecting two groups differing on some independent variable and comparing them on some dependent variable" (Gay & Airasian, p. 340). Gay and Airasian further explained that in a causal-comparative study, there must be two groups of participants in that one group possess a characteristic that the other does not. In this case, both groups are Montana students that have taken the MontCAS Criterion Referenced Test in the spring of the years 2007-2013. The only differing characteristic between the two groups was that one group, referred to in statistics as the experimental group, was those students in Montana schools who are

being educated in a school that utilized a four day week. The other group, described in statistics as the control group, were students in Montana schools that utilized the traditional five day week format.

Research Question

Schools have reported that they changed from the traditional school week to the four day initially to save money through less use of utilities (Feaster, 2002; Roeth, 1985). Other schools have reported that they have changed to a four day week for other reasons including more efficient use of time, better student attendance, better teacher attendance, and improved student achievement (OPI, 2009; OPI, 2011; Ryan, 2009; Anderson & Walker, 2012; Dam, 2006; Hale, 2007; Feaster, 2002; Blankenship, 1984). However, as previously established, there is no scientifically-based research on the impact on student-achievement in schools in Montana that have utilized a four day week schedule.

The specific question and focus of this study is to investigate the relationship between student achievement scores on the MontCAS assessment from schools that use a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that follow a traditional five day school week.

Sampling Framework vs. Population Census

This research did not employ any sampling techniques as all of the data from every student in every school that utilized the four day school week in Montana was used. The MontCAS scores from every school that used the four day week were analyzed separately by cohort based upon the year of implantation of the four day week. The scores were also analyzed to include all students in schools utilizing the four day week regardless of the year of

implementation. Both sets of data were then compared with the state-wide scores from the same year using student scores from all of Montana's schools.

Participants

The participants in this causal comparative causal comparative study were every student in the state of Montana who took the MontCAS test between 2007 and 2013. The number of students that took the MontCAS state-wide is over 70,000 annually while the number of these students who attended school in a four day week school started at 207 in 2007 and increased annually to 2685 in 2013.

Data Collection Procedure

Information about student achievement on the MontCAS test results is not provided for public dissemination for any group or sub-group tested that numbers less than twenty. This could have proven to be problematic, given that out of the ten schools that utilized a four day week in 2006-2007, only four of them had more than twenty students tested. However, the Montana Office of Public Instruction agreed to provide the data from every school in the state contingent on the individual data from the smallest schools not being released but consented to the school being identified in the composite.

Informed Consent and Confidentiality

The Family Educational Rights and Privacy Act (FERPA) protects the privacy of student education records for any schools that receive funding from the U.S. Department of Education (U. S. Department of Education, 2013) unless parents have waived their rights to keep these records confidential. However, all data released describing individual schools in this research will be that which is publicly available and reported publicly by the Montana Office of Public Instruction so no individually identifiable record of progress about any individual students will

be used. To further protect the anonymity of individual students, data from the smallest schools (population tested less than 20) were only used in the aggregate with other schools tested in a given year. Testing data that named individual school districts were only from schools of sufficient size that the information was already released publicly by the Montana Office of Public Instruction in another format. This study did not require any direct contact between the researcher and any students.

Data Collection

Data was requested and provided by the Montana Office of Public Instruction regarding student achievement in Montana on the MontCAS test from 2007-2013. This 19 by 3555 Excel spreadsheet contained data from the MontCAS test from every school that was utilizing a four day school week at the time of the MontCAS assessment. Data provided indicated the number of students tested along with the percentages of student that were novice, nearing proficiency, proficient, and advanced in reading, mathematics, and science. An additional tab on the spreadsheet included compiled data from the entire state that listed the total numbers tested and the percentage of students scoring in each of the four categories for each of the three tests. Finally, since all of the schools that utilize a four day week are smaller schools, the same compiled data from 2007-2013 was provided that represented all of the schools with an enrolment of less than 135 students.

Prior to the data being provided to the researcher, an "Application to Conduct Research with Student Level Data Collected by the OPI" was filled out and submitted to Denise Bond at the Montana Office of Public Instruction. (APPENDIX A) In follow-up conversations arranged by Dennis Parman, Deputy Superintendent of Public Instruction, the researcher was put in contact with Eric Meredith, Education Data Analyst with the Measurement and Accountability

Division at the Office of Public Instruction. Verbal and written correspondence received from Eric Meredith on November 4, 2013 (APPENDIX B) confirms the agreement from OPI to share the data, the methodology for the secure transfer of the data, and the expectation that the data be destroyed after completion of the analysis.

Data Analysis

The data collected in the study were analyzed utilizing Microsoft Excel to determine whether differences exist between the groups of students in schools with a four day week as compared to those in a traditional five day week. The No Child Left Behind Act (NCLB), in part, determines if a school has made Adequate Yearly Progress (AYP) by calculating the percentage of students who are determined to be at least proficient on a criterion referenced test. The analysis consisted of looking at the percentage of students that were at least proficient (sum of proficient and advanced) as measured by the MontCAS test in a given year.

The percentage of students scoring in each of the four categories (novice, nearing proficient, proficient, and advanced) on each of the three tests (reading, mathematics, science) was provided by OPI. These percentages were then utilized along with the number of students tested to determine exactly how many student scored in each of the categories. The total number students scoring in each of the four categories were then summed and percentages in each category were calculated. The percentage proficient and the percentage advanced were then compiled for each year to determine an overall percentage of students at least proficient from schools utilizing a four day week.

Internal and External Validity

Internal validity deals with rival explanations that can affect the outcome of an experimental study but are not part of the independent variable (Gay & Airasian, 2003). A risk

of internal validity exists within this study when measuring the achievement of students in schools that have changed to a four day week. Change to a four day week is a significant event for a community, and there could be an increase in teacher focus and parental involvement to make this successful. There is a chance that the by-product is increased student achievement which may not be tied directly to the four day week (Daly & Richburg, 1984). This could be the case early in the implementation process of a district converting to the four day week, so the same descriptive statistics will be performed on data from schools that have been utilizing the four day week to see if any difference exists amongst schools that have used a four day week for less than five years as compared to those schools using the four day week for more than five years. This is the phenomenon that Daly and Richburg described as "leveling" of student achievement.

External validity refers to the ability to extrapolate the conclusions from the data gathered and apply it across the population (Howell, 2002). Any conclusions made from data calculations should be carefully applied to rural schools only. As previously established, the only schools included in this research are rural schools in Montana. There should be solid external validity for other small rural schools in Montana and likely small rural schools across the United States, but not for larger urban school districts.

Summary

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that used a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that followed a traditional five day school week. Anecdotal evidence and non-peer-reviewed research in other states would seem to suggest

that there is no significant difference in student achievement post-implementation of the four day school week. Criterion referenced scores from student testing done in the springs of every year from 2007 through 2013 were analyzed to see if there is a difference between student achievement in schools using a four day week as compared to those using the traditional five day week.

CHAPTER FOUR

FINDINGS

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that used a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that followed a traditional five day school week. To determine if there was a difference between student achievement scores in schools that have utilized a four day week as compared to the rest of the students in the state, scores from the MontCAS assessment from 2007-2013 were compiled and analyzed.

Research Question

The research question that was explored in this study was: What is the difference between student achievement scores in schools that utilize a four day school week as compared to student scores in schools that follow a traditional five day schedule? Based upon this question, the percentage of students scoring novice, nearing proficient, proficient, and advanced on the MontCAS test from 2007-2013 from every school that utilized the four day school week were compiled and analyzed.

Data Collection Procedures

As described in Chapter Three and above, the percentage of students achieving at least proficient on the MontCAS test in every school utilizing the four day week was compiled. Total statewide percentages from each year across all of Montana as well as percentages from those schools that have populations of less than 135 were provided by OPI. The data from the schools with student populations less than 135 were analyzed to see if there was any difference in student performance at the smaller rural schools as compared to the statewide averages as well as a way

to compare the four day a week students with students in the smaller schools. The data were combined and compared in various ways looking specifically at average student performance on the reading, mathematics, and science portions of the MontCAS test from 2007-2013. Further disaggregation was performed to separate the 22 schools that have been utilizing a four day school week for more than five years.

Findings

Findings are based upon calculating the percentage of students proficient and advanced on the three components of the MontCAS test administered in Montana in the springs of 2007-2013 and disaggregating them in various ways. To summarize the 14 tables that follow, Table 1 is simply a breakdown of the number of students tested in schools that follow a four day a week format compared to all students tested in Montana. Tables 2, 3, and 4 are statewide results on the MontCAS. Tables 5, 6, and 7 are statewide results on the MontCAS for those schools with student population of less than 135. Tables 8, 9, and 10 further focuses in on the same information but just for those students in schools that utilized a four day week. Tables 11, 12, and 13 compare the information from the previous nine tables by combining all of the reading results, math results, and science results. Table 14 specifically looks at information from students in schools that have used a four day week for five years or more.

Table 1

Total Number of Students Tested with the MontCAS Each Year from 2007-2013

	READING		MATHEMATICS		SCIENCE	
Year	Four Day	Statewide	Four Day	Statewide	Four Day	Statewide
2007	207	72771	207	72871	0	0
2008	315	72551	315	72558	139	31684
2009	430	70951	429	70943	196	30620
2010	1101	70484	1090	70570	519	30204
2011	1111	70482	1109	70490	503	30173
2012	1856	70567	1865	70582	806	30021
2013	2685	71100	2686	71208	1167	30286

Table 1 summarizes the total number of students tested in the state of Montana on the MontCAS as compared to the students tested who attended school in a district that utilized the four day school week. It should be noted that students in Montana did not participate in the Science portion of the MontCAS in the 2006-2007 school year, which is why there are zeros in that category. One can observe the growth of the four day week as less than 0.3% of the students in Montana were in four day per week schools in 2006-2007 while that number jumped to almost 3.8% in 2012-2013 which is an increase over 1300%. It is important to note that the numbers listed in the column Four Day are included in the Statewide column for each of the years.

Table 2

Statewide Percentages on the MontCAS in Reading in Each of Four Categories from 2007-2013

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	72771	6.18	11.93	43.54	38.36
2008	72551	5.98	11.74	38.96	43.32
2009	70951	5.20	11.44	37.17	46.19
2010	70484	4.81	10.03	34.73	50.43
2011	70482	4.92	9.28	33.55	52.25
2012	70567	3.51	9.11	35.67	51.71
2013	71100	5.20	9.61	35.64	49.55

Table 2 breaks down the total students tested in Montana in the area of Reading during the course of the MontCAS testing from 2006-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 3

Statewide Percentages on the MontCAS in Math in Each of Four Categories from 2007-2013

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	72871	14.12	21.63	38.51	25.74
2008	72558	13.73	22.44	38.00	25.83
2009	70943	13.91	21.00	35.96	29.13
2010	70570	12.44	19.36	37.41	30.80
2011	70490	12.12	19.18	36.79	31.90
2012	70582	12.37	18.29	36.06	33.29
2013	71208	14.01	18.69	35.82	31.48

Table 3 analyzes the total students tested in Montana in the area of Mathematics during the course of the MontCAS testing from 2006-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 4

Statewide Percentages on the MontCAS in Science in Each of Four Categories from 2007-2013

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2008	31684	13.53	30.85	40.74	14.88
2009	30620	13.11	29.32	42.06	15.51
2010	30204	12.17	29.16	40.54	18.12
2011	30173	12.37	28.51	42.37	16.75
2012	30021	11.10	27.45	42.16	19.29
2013	30286	12.18	25.97	42.10	19.75

Table 4 analyzes the total students tested in Montana in the area of Science during the course of the MontCAS testing from 2007-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced. Note that only students in grades 4, 8, and 10 took the MontCAS science component whereas all students in grades 3-8 and 10 took the reading and math components. This explains why the number tested in Tables 2 and 3 are 71,100 and 71,208 while the total tested in table 4 is 30,286. Also, the science component was not taken in Montana until the spring of 2008 while reading and math MontCAS assessments began in the spring of 2007.

Table 5

Statewide Percentages on the MontCAS in Reading in Each of Four Categories from 2007-2013 From Schools That Have Less Than 135 Students

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	14456	7.28	12.93	44.67	35.11
2008	14023	6.75	12.05	39.00	42.20
2009	13557	5.73	12.18	37.75	44.34
2010	13079	5.55	10.80	35.61	48.04
2011	13015	5.84	10.00	34.21	49.95
2012	12767	3.73	9.57	36.77	49.93
2013	12467	5.86	10.74	37.13	46.27

Table 5 disaggregates the students tested on the MontCAS in the state of Montana who came from a school where the total student population was less than 135. Table 5 specifically looks at the results of these students from smaller schools and analyzes their performance on the Reading test from 2007-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 6

Statewide Percentages on the MontCAS in Mathematics in Each of Four Categories from 2007-2013 From Schools That Have Less Than 135 Students

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	14470	16.25	23.13	37.93	22.69
2008	14024	14.64	23.70	37.91	23.75
2009	13552	15.47	22.14	35.85	26.55
2010	13090	13.38	20.62	38.70	27.30
2011	12994	12.98	20.20	37.95	28.87
2012	12754	13.28	20.10	36.29	30.32
2013	12487	15.34	19.87	36.60	28.20

Table 6 disaggregates the students tested on the MontCAS in the state of Montana who came from a school where the total student population was less than 135. Table 6 specifically looks at the results of these students from smaller schools and analyzes their performance on the Mathematics test from 2007-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 7

Statewide Percentages on the MontCAS in Science in Each of Four Categories from 2008-2013 From Schools That Have Less Than 135 Students

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2008	6265	12.75	30.69	42.81	13.74
2009	5974	12.27	30.43	43.12	14.18
2010	5873	11.60	28.89	42.23	17.28
2011	5737	12.31	28.43	44.13	15.13
2012	5739	10.47	27.11	42.71	19.71
2013	5623	11.97	26.61	43.57	17.86

Table 7 disaggregates the students tested on the MontCAS in the state of Montana who came from a school where the total student population was less than 135. Table 7 specifically looks at the results of these students from smaller schools and analyzes their performance on the Science test from 2007-2013 and disaggregates their performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 8

Percentages on the MontCAS in Reading in Each of Four Categories from 2007-2013 From Schools Utilizing a Four Day School Week

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	207	2.9	10.1	49.8	37.2
2008	315	3.5	13.7	39.4	43.5
2009	430	6.7	12.3	36.7	44.2
2010	1101	7.2	11.6	36.3	44.9
2011	1111	6.1	11.4	38.3	44.1
2012	1856	4.6	14.1	39.9	41.4
2013	2685	7.6	13.7	37.4	41.3

Table 8 further disaggregates the students tested on the MontCAS in the state of Montana to specifically look at performance on the Reading portion of the MontCAS from 2007-2013 by just those students who were in schools that followed a four day week. As is also seen on other tables, this table also disaggregates student performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 9

Percentages on the MontCAS in Mathematics in Each of Four Categories from 2007-2013 From Schools Utilizing a Four Day School Week

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2007	207	9.2	20.3	44.9	25.6
2008	315	14.6	23.5	40.6	21.3
2009	429	17.7	23.8	37.8	20.7
2010	1090	16.3	25.2	37.7	20.7
2011	1109	16.0	24.2	38.8	21.1
2012	1865	18.9	23.6	35.2	22.3
2013	2686	20.3	22.5	35.4	21.8

Table 9 further disaggregates the students tested on the MontCAS in the state of Montana to specifically look at performance on the Mathematics portion of the MontCAS from 2006-2013 by just those students who were in schools that followed a four day week. As is also seen on other tables, this table also disaggregates student performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 10

Percentages on the MontCAS in Science in Each of Four Categories from 2008-2013 From Schools Utilizing a Four Day School Week

Year	Total Tested	% Novice	% Nearing Proficient	% Proficient	%Advanced
2008	136	8.8	32.4	41.9	16.9
2009	196	12.8	31.1	44.4	11.7
2010	519	18.7	29.7	37.2	14.5
2011	503	13.3	32.0	40.8	13.9
2012	806	15.1	32.0	35.9	17.0
2013	1167	15.5	32.0	36.7	15.8

Table 10 further disaggregates the students tested on the MontCAS in the state of Montana to specifically look at performance on the Science portion of the MontCAS from 2007-2013 by just those students who were in schools that followed a four day week. As is also seen on other tables, this table also disaggregates student performance into the four categories of Novice, Nearing Proficient, Proficient, and Advanced.

Table 11

Summary of Proficient and Advanced Percentages in Reading From Four Day a Week Schools, All Schools with Less Than 135 Students, and Statewide Scores

Year	Four Day Week Schools	Less than 135 Enrolled	Statewide
2007	87.0	79.8	81.9
2008	82.9	81.2	82.3
2009	80.9	82.1	83.4
2010	81.2	83.6	85.2
2011	82.4	84.2	85.8
2012	81.4	86.7	87.4
2013	78.7	83.4	85.2

Table 11 represents composite data from tables 2, 5, and 8 and was calculated by adding the percentage of students who were proficient and advanced on the Reading portion of the MontCAS from the years 2006-2013. It is important to note that the column with statewide scores includes all of the data from Montana, including the student data in the other two columns. Furthermore, the column with data from schools with an enrollment of less than 135 is also going to include those smaller four day a week schools.

Table 12

Summary of Proficient and Advanced Percentages in Mathematics From Four Day a Week Schools, All Schools with Less Than 135 Students, and Statewide Scores

Year	Four Day Week Schools	Less than 135 Enrolled	Statewide
2007	70.5	60.6	64.2
2008	61.9	61.7	63.8
2009	58.5	62.4	65.1
2010	58.4	66.0	68.2
2011	59.9	66.8	68.7
2012	57.5	66.6	69.3
2013	57.2	64.8	67.3

Table 12 represents composite data from tables 3, 6, and 9 and was calculated by adding the percentage of students who were proficient and advanced on the Mathematics portion of the MontCAS from the years 2006-2013. It is important to note that the column with statewide scores includes all of the data from Montana, including the student data in the other two columns. Furthermore, the column with data from schools with an enrollment of less than 135 is also going to include those smaller four day a week schools.

Table 13

Summary of Proficient and Advanced Percentages in Science From Four Day a Week Schools, All Schools with Less Than 135 Students, and Statewide Scores

Year	Four Day Week Schools	Less than 135 Enrolled	Statewide
2008	58.8	56.6	55.6
2009	56.1	57.3	57.6
2010	51.6	59.5	58.7
2011	54.7	59.3	59.1
2012	52.9	62.4	61.5
2013	52.4	61.4	61.9

Table 13 represents composite data from tables 4, 7, and 10 which was calculated by adding the percentage of students who were proficient and advanced on the Science portion of the MontCAS from the years 2007-2013. It is important to note that the column with statewide scores includes all of the data from Montana, including the student data in the other two columns. Furthermore, the column with data from schools with an enrollment of less than 135 is also going to include those smaller four day a week schools.

Table 14

Summary of Proficient and Advanced Percentages in Reading, Mathematics, and Science for the 22 Schools Utilizing the Four Day Week for Five Years or More

Year	Reading Prof & Adv	Math Prof & Adv	Science Prof & Adv
2011	84.2	63.2	56.1
2012	81.8	57.6	54.1
2013	78.8	52.9	52.9

Because of the question about a "leveling of performance" described by Daly and Richburg (1984), a further disaggregation was done with the four day a week schools to look specifically at student performance at schools that had been following a four day week for more than five years. This was done to see what the long-term effect is on student performance in schools that have been using a four day week for an extended period of time. Since Montana only started allowing four day a week scheduling during the 2007-2008 school year, the number of schools with five years of experience only produced three years worth of data in years five, six, and seven of implementation across the state. This list of 22 schools from which student scores were compiled analyzed is included in Appendix C. This group was fairly stable in numbers over the three years with 439 tested students included in 2010-2011, 412 tested students in 2011-2012, and 434 tested students included in 2012-2013.

Summary

The data analyzed and discovered in Chapter Four was very interesting in that disaggregation of the state-wide numbers revealed results previously not seen. Further disaggregation and compilation revealed interesting results discussed in Chapter Five.

CHAPTER FIVE

CONCLUSION

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that used a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that followed a traditional five day school week. The MontCAS test was an ideal test to use as it was given in every school in Montana and the period of time that the MontCAS was administered in Montana corresponded directly with the first seven years of implementation of the four day school week across Montana.

Findings and Interpretation

Table 11 indicated that Montana students taking the Reading component of the MontCAS in 2007 scored 81.9% proficient or advanced while the sub-group of students in four day a week schools scored 87.0% proficient or advanced. The following year, students in four day a week schools scored slightly better than the state with 82.9% proficient and advanced compared to 82.3% for the entire population of students tested. During the testing in the spring of 2009 and every year thereafter, students achieving proficient or advanced status in four day a week schools did so at a lower rate than the rest of the state. Figure 2 summarizes the results and graphically demonstrates how the four day a week students are being out-performed by the total population of students tested. As a point of comparison, the percentage of students testing proficient and advanced from schools with populations less than 135 is also included.

Figure 2

Percentage of Students Proficient and Advanced in Reading 2007-2013

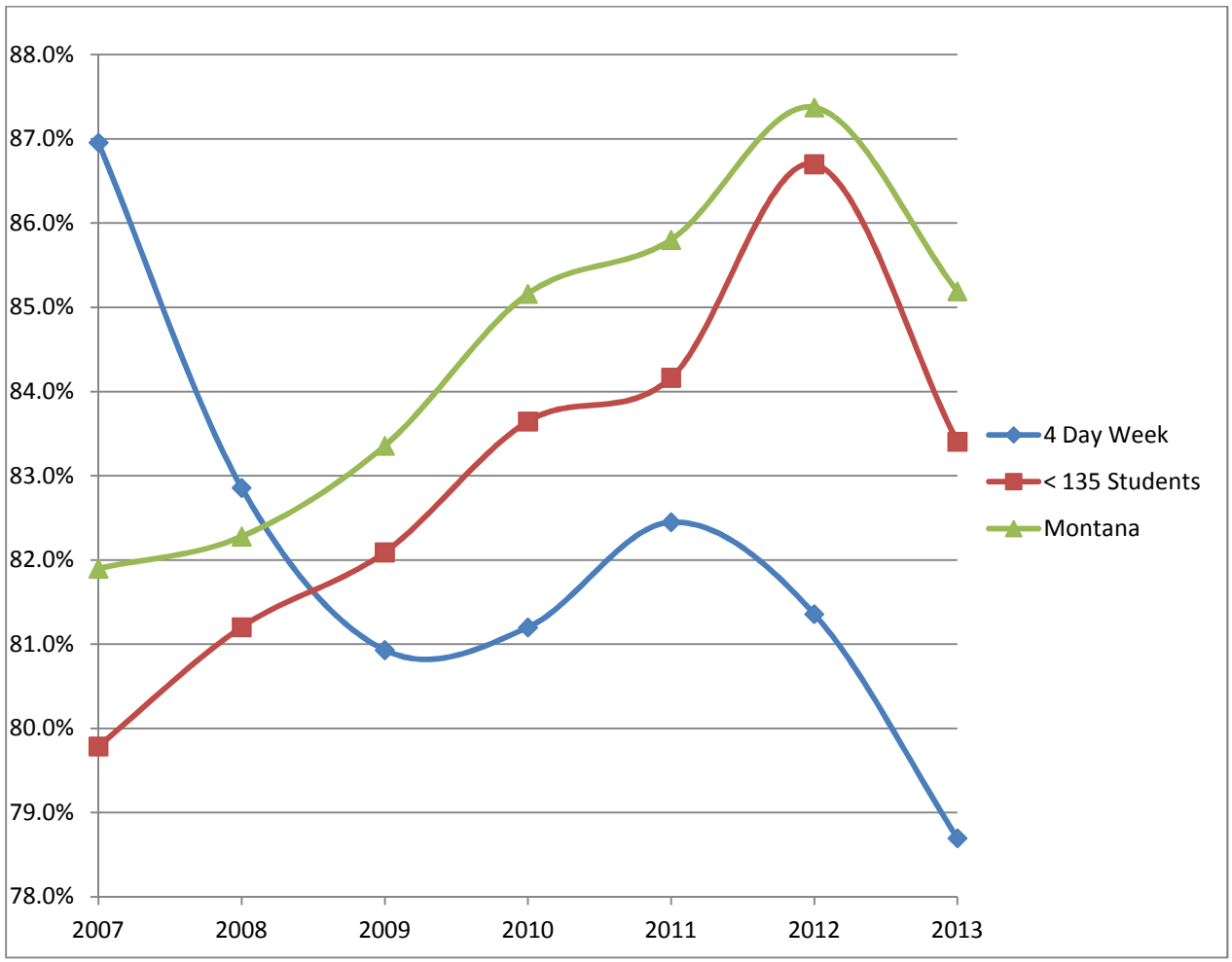


Figure 3 demonstrates similar results that are seen when analyzing the percentage of students scoring proficient or advanced on the mathematics portion of the MontCAS. During the first year of implementation in 2006-2007, the students tested in four day a week schools out-scored the rest of the state by a 70.5% to 64.2% margin. But every year after that, students in the state as a whole out-scored students in four day week schools by a growing margin each year. This percentage difference grew to over ten percent in 2011-2012 and 2012-2013.

Figure 3

Percentage of Students Proficient and Advanced in Mathematics 2007-2013

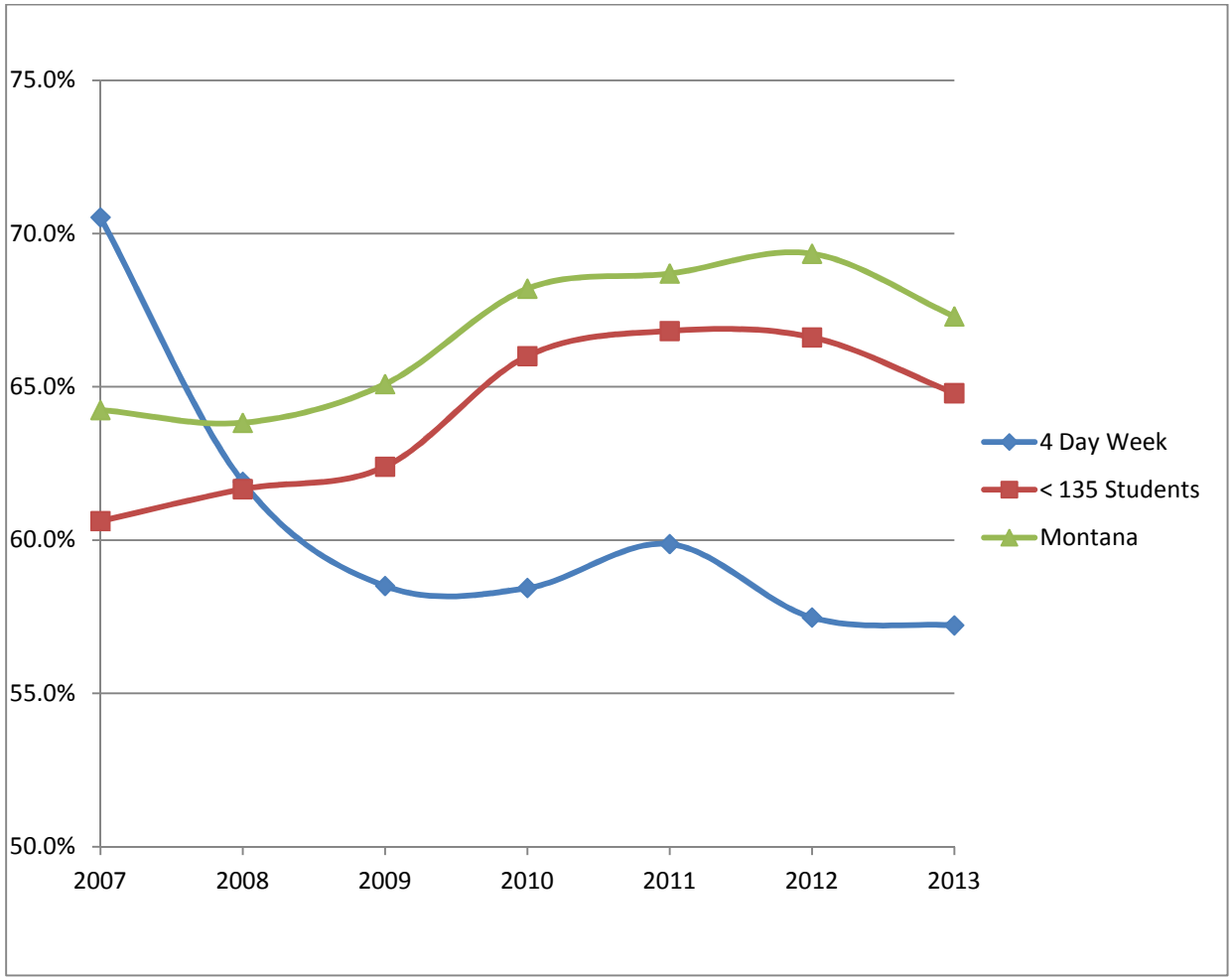
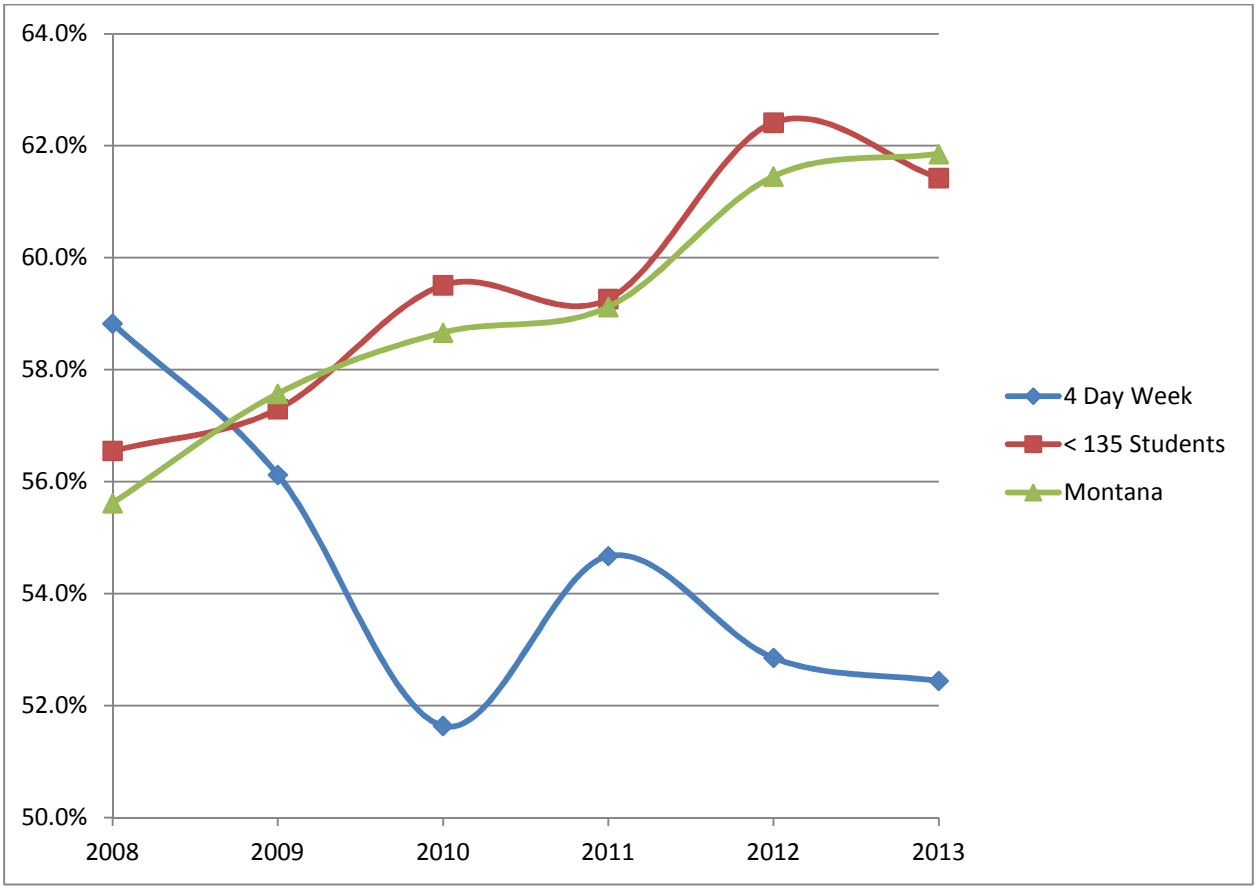


Figure 4 shows the corresponding results as indicated in Figures 2 and 3 but for science. Interestingly the line representing students in the schools with less than 135 students seems to cross back and forth across the state percentage of proficient and advanced, but the four day a week students are again better than the state for the first year and then declines in comparison.

Figure 4

Percentage of Students Proficient and Advanced in Science2008-2013



All three graphs in Figures 2, 3, and 4 indicate that in the first year of implementation, the 207 students tested in the ten schools that made the conversion to a four day week outperformed the rest of the students in Montana by wide margins. In the second year of the four day week in Montana, the 315 students tested in 14 schools still either outperformed the rest of the students in the state or were close. But by the third year (2009), the students in the state as a whole outperformed the four day a week students by 2.4% in Reading, 6.6% in Math, and 1.5% in Science. This indicates that in the first two years of a four day week, students in these schools did better than the rest of the state.

All three graphs in figures 2, 3, and 4 also show an increase in 2011 scores before beginning a negative trajectory. This can possibly be explained by looking at the significant influx of schools converting to a four day week in 2010 and 2011. If the same logic applies that schools do well in the first year or two after conversion to a four day week, but then drops off, the jump from 430 students tested in 2009 to 1101 in 2010 and then nearly an identical 1111 in 2011 this increase in scores could be the new first and second year students buoying the average. Additional students were added in subsequent years, and one might reason that additional new four day a week student scores would keep the average scores up, but by the time we get to the fifth, sixth, and seventh year of four day weeks, there are a significant number of students who have been in four day week schools for quite some time.

Figure 5

Percentage of Students Proficient and Advanced in Reading in Schools Operating with a Four Day Week for Over Five Years in Montana as Compared to Statewide Totals

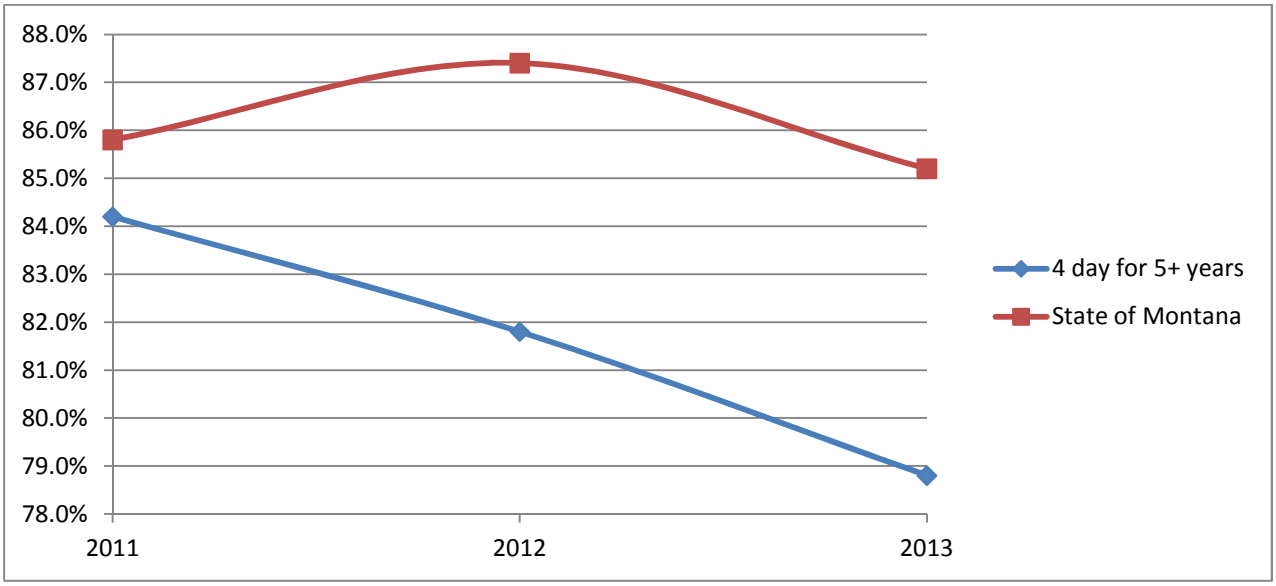


Figure 5 shows how in 2011, the difference between test scores proficient and advanced from students in schools that had utilized the four day school week for more than five years was less than 2 percentage points lower than the statewide percentages of students proficient and advanced. In 2012, this discrepancy grew to 5.6% and in 2013 the difference grew to 6.4% with 78.8% of the students in schools with the four day week for over five years scoring at least proficient while students in the state of Montana had 85.2% scoring at least proficient.

Figure 6

Percentage of Students Proficient and Advanced in Mathematics in Schools Operating with a Four Day Week for Over Five Years in Montana as Compared to Statewide Totals

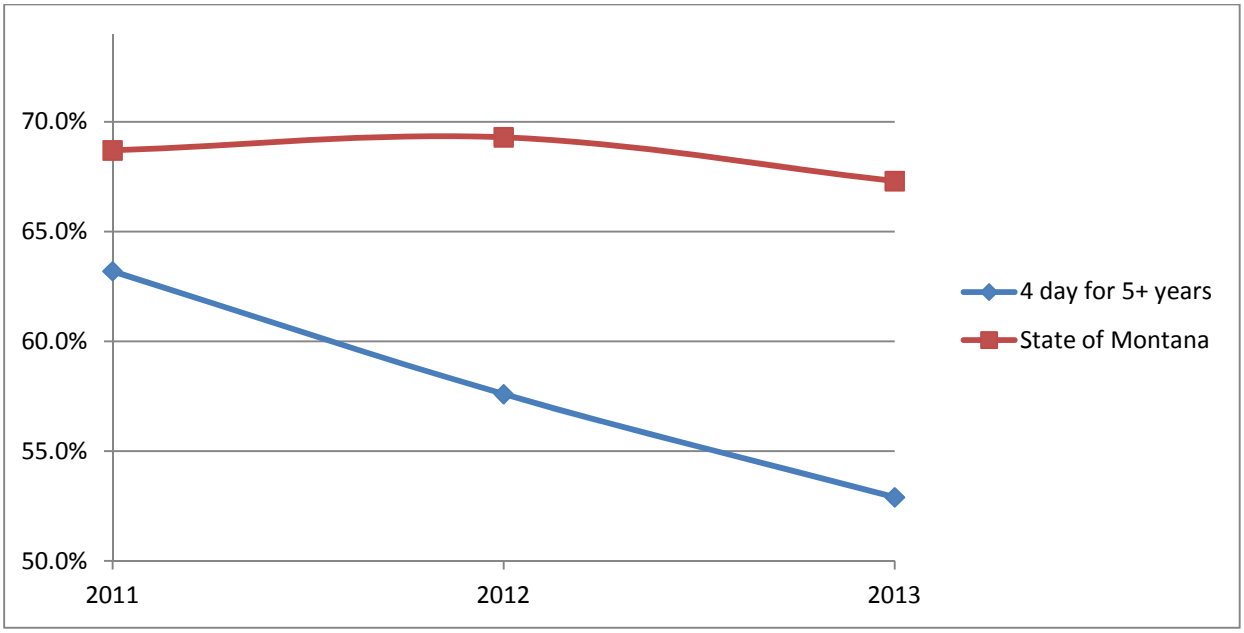


Figure 6 shows how in 2011, the difference between test scores proficient and advanced from students in schools that had utilized the four day school week for more than five years was 5.5 percentage points lower than the statewide percentages of students proficient and advanced. In 2012, this discrepancy grew to 11.7% and in 2013 the difference grew to 14.4% with 52.9% of

the students in schools with the four day week for over five years scoring at least proficient while students in the state of Montana had 61.9% scoring at least proficient.

Figure 7

Percentage of Students Proficient and Advanced in Science in Schools Operating with a Four Day Week for Over Five Years in Montana as Compared to Statewide Totals

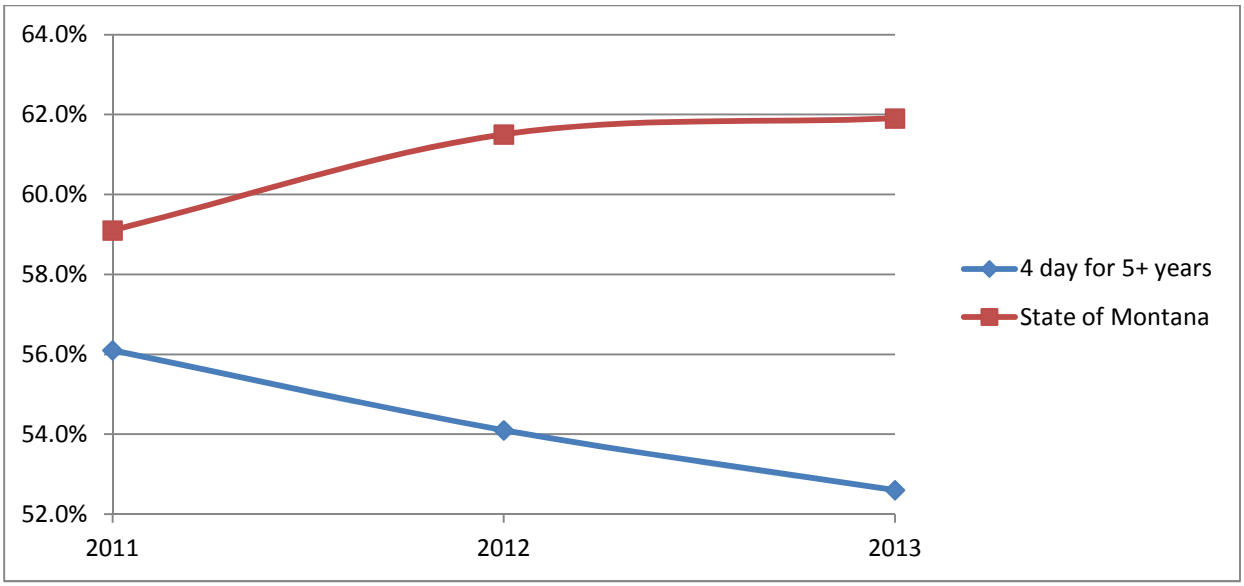


Figure 7 shows how in 2011, the difference between test scores proficient and advanced from students in schools that had utilized the four day school week for more than five years was 3 percentage points lower than the statewide percentages of students proficient and advanced. In 2012, this discrepancy grew to 7.4% and in 2013 the difference grew to 9.3% with 52.6% of the students in schools with the four day week for over five years scoring at least proficient while students in the state of Montana had 61.9% scoring at least proficient.

Figure 8

Percentage of Students Proficient and Advanced in Schools Operating with a Four Day Week for Over Five Years

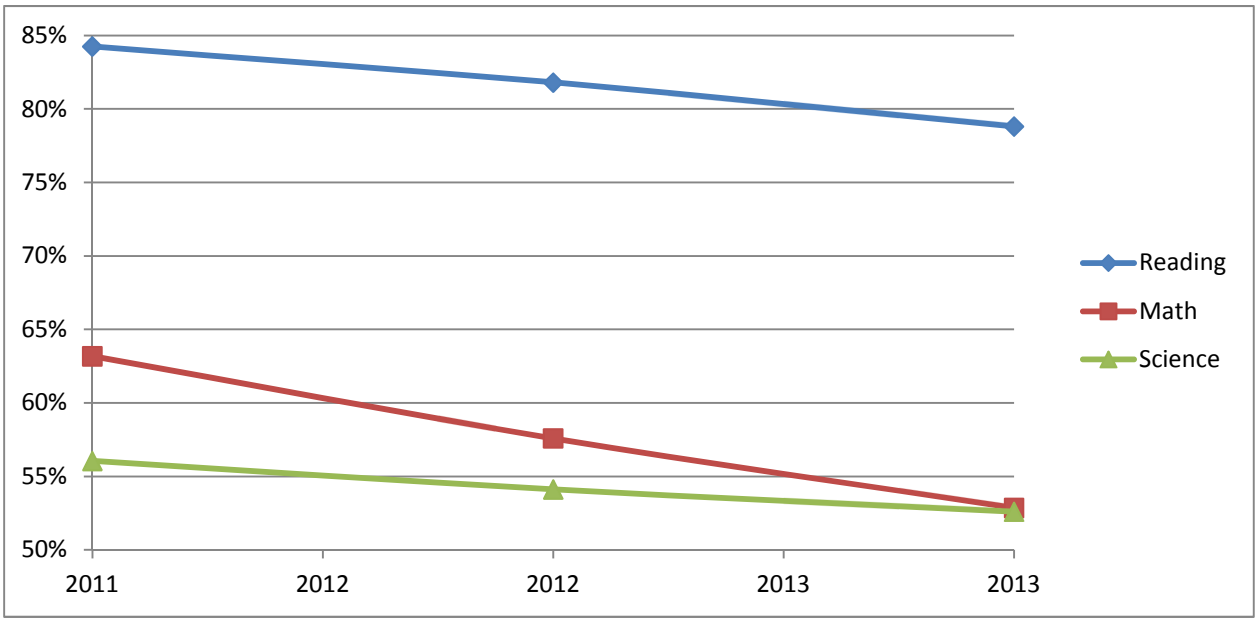


Figure 8 graphically demonstrates the downward trajectory in student scores seen in reading, math, and science in schools that have been utilizing the four day school week for over five years by combining data in Figures 5, 6, and 7. This list of schools is found in Appendix C.

The student data compiled in Figures 5-8 were a cohort of schools that utilized the four day week beginning in 2007, 2008, and 2009. After analyzing the information gleaned from the data summarized in Figures 5-8, consideration was given to looking at individual cohorts of students based upon the year that the school adapted the four day school week. The results that appear in the next three tables isolate student test scores based upon solely the year that the school they attended started the four day week and it follows the student data from those schools from the start of the four day week in that system through 2013.

Table 15

Cohort Data on the Reading Portion of the MontCAS from Disaggregating Student Data Based Upon the Year That Their School Changed to a Four Day Week (total Proficient and Advanced)

Year	C1	C2	C3	C4	C5	C6	C7	MT
2007	**87.0**							81.9
2008	**84.4**	80.0						82.3
2009	**86.3**	**84.5**	77.3					83.4
2010	**88.2**	82.9	79.7	79.0				85.2
2011	**91.1**	79.1	82.7	80.1	**86.7**			85.8
2012	87.2	72.0	80.8	82.7	84.2	80.5		87.4
2013	81.9	79.2	74.2	76.8	82.1	77.0	82.2	85.2

(**Bold** numbers indicate percentages above the state average for a given year.)

It is interesting to note that three cohorts increased (C2, C3, C4) and three cohorts decreased (C1, C5, C6) the percentage of students proficient from their first year to their second year of operating with a four day school week. Cohort 1 experienced a drop-off initially, but then showed growth for the next three years that exceeded the growth in the rest of the state. However, a decline of nearly 10% occurred over the next two years while the state as a whole only experienced a 0.6% decline in reading over the last three years. With the exception of Cohort 5, in the first year (2011) and Cohort 1 as noted above, all scores were lower than the statewide percentage of students scoring proficient and advanced.

Figure 9

Percentage of Students Attending Four Day Week Schools Scoring Proficient and Advanced in Reading by Cohort Along with the Total for the State of Montana

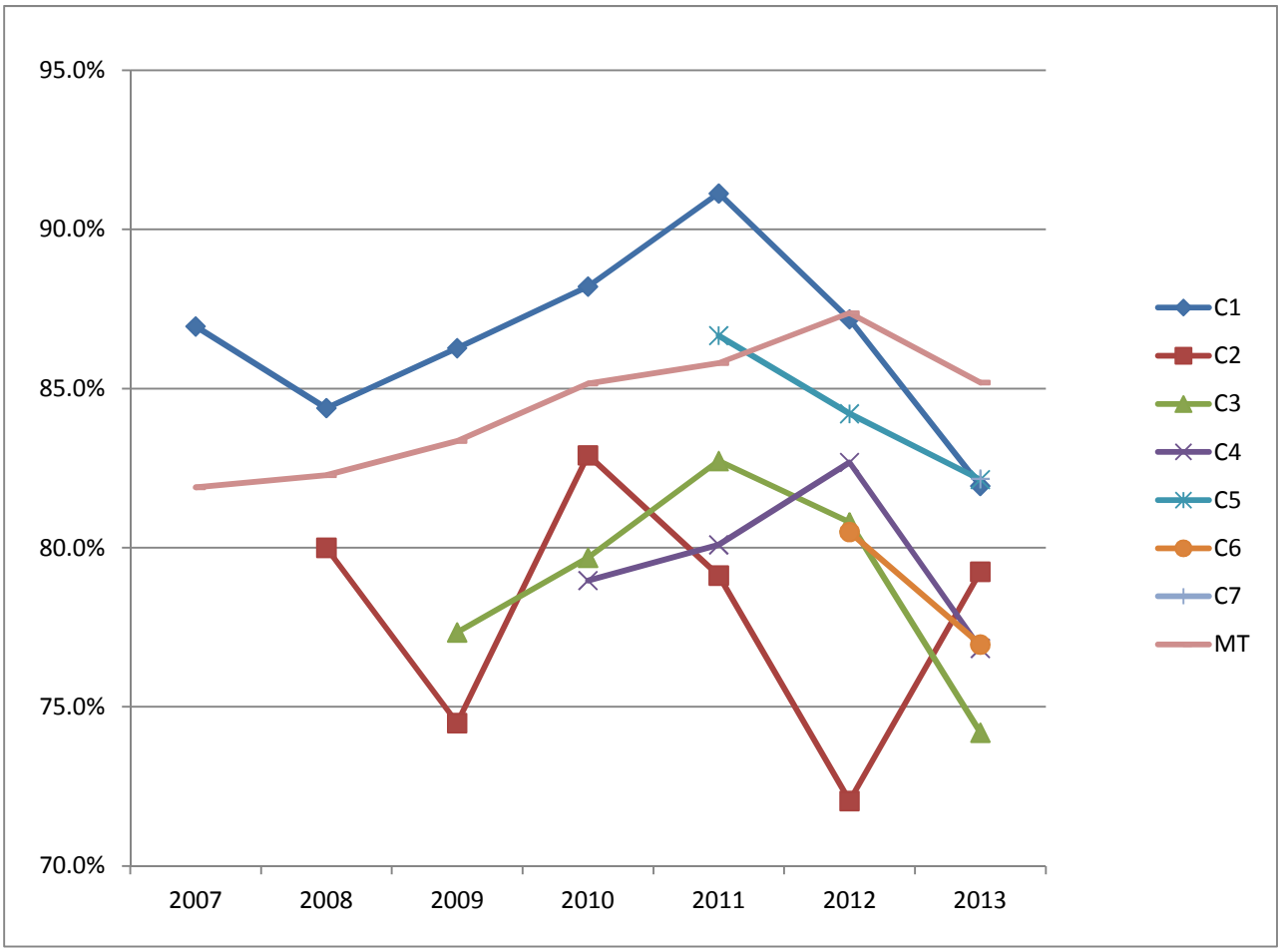


Figure 9 is a graphical representation of the data found in Table 15. By breaking the data out into cohorts, the cohorts show more fluctuation year to year, but the one constant, with the exception of Cohort 1 in years 2007-2011 and Cohort 5 in 2011, is that the percentage of students proficient and advanced in Reading lags behind the state.

Table 16

Cohort Data on the Math Portion of the MontCAS from Disaggregating Student Data Based Upon the Year That Their School Changed to a Four Day Week (total Proficient and Advanced)

Year	C1	C2	C3	C4	C5	C6	C7	MT
2007	**70.5**							64.2
2008	**65.4**	55.5						63.8
2009	60.8	48.0	**77.3**					65.1
2010	**69.8**	56.3	**79.7**	54.8				68.2
2011	63.7	56.5	**82.7**	57.7	**75.3**			68.7
2012	62.8	51.6	**80.8**	53.4	68.4	60.5		69.3
2013	51.1	56.6	**74.2**	54.7	57.1	55.7	63.2	67.3

(**Bold** numbers indicate percentages above the state average for a given year.)

By disaggregating the math scores by Cohort, the data appears to be a little more sporadic with more scores above the state average than seen in the reading data in Table 15, but there are some key things to note. Cohort 3, which is made up of the Alberton K-12 Schools, Custer K-12 Schools, and three small elementary districts (Greycliff, SY, and Salmon Prairie), outperformed all other cohorts as well as the state of Montana for all of the years they have operated with a four day week. All other cohorts, with the exception of a minor increase for Cohort 4, experienced substantial decreases after the first year of implementation. By 2013, all Cohorts, except for Cohort 3, were below the state in the percentage of students scoring proficient and advanced on the mathematics portion of the MontCAS.

Figure 10

Percentage of Students Attending Four Day Week Schools Scoring Proficient and Advanced in Mathematics by Cohort Along with the Total for the State of Montana

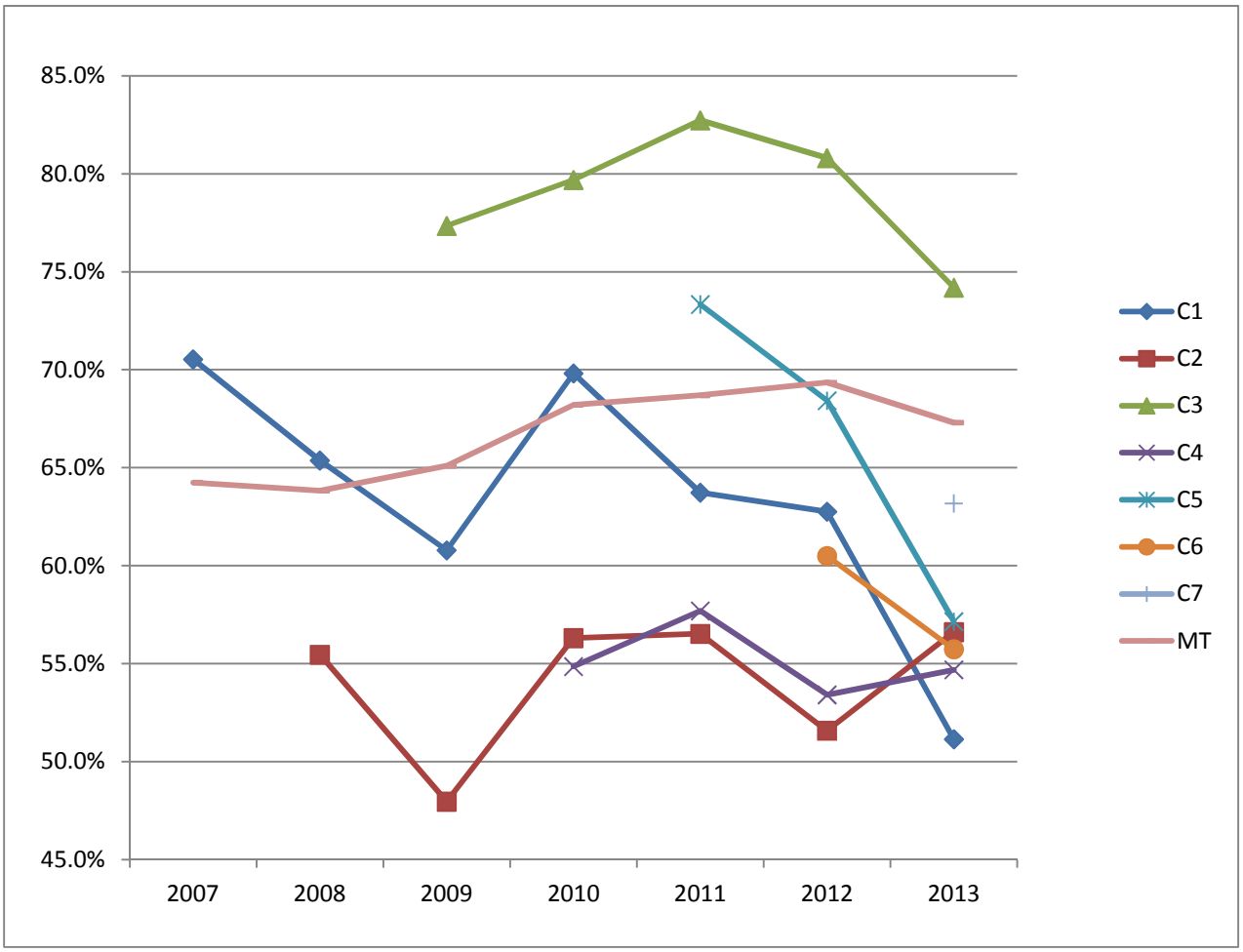


Figure 10 is a graphical representation of the information found in Table 16. The smaller data groups generate more peaks and valleys that leveled off when the data were combined as can be seen in Figures 3 and 6. But one can observe that even though Cohort 3 remains above the statewide scores and Cohort 1 and 5 are intermittently above the line representing the statewide percentage of students at least proficient, all but one cohort is below the state percentage of students proficient and advanced in math by 2013.

Table 17

Cohort Data on the Science Portion of the MontCAS from Disaggregating Student Data Based Upon the Year That Their School Changed to a Four Day Week (total Proficient and Advanced)

Year	C1	C2	C3	C4	C5	C6	C7	MT
2008	**61.4**	54.7						55.6
2009	55.2	**60.4**	54.1					57.6
2010	**61.4**	43.8	**59.0**	48.9				58.7
2011	**64.2**	**69.2**	46.5	50.0	**60.0**			59.1
2012	**72.9**	36.2	45.3	58.2	40.0	47.9		61.5
2013	53.1	59.2	46.9	55.4	27.3	46.2	56.8	61.9

(**Bold** numbers indicate percentages above the state average for a given year.)

When disaggregating out the student data from the science test by cohort, there are more cohorts that cross back and forth across the line representing the total percentage of Montana students proficient and advanced than seen in either the math scores or the reading, but there is a consistency in that the majority of the scores are below the state line. It is interesting to note that by year three, Cohort 1 seems to be consistently staying above the state, but drops below the state in year seven. Cohort 2 seems to take inexplicable jumps up and down, but it is important to note that this is a relatively small cohort of only three schools made up of Noxon K-12 Schools along with Ovando and Spring Creek Elementary Schools. By 2013, all cohorts are achieving below the statewide percentages for students scoring proficient and advanced on the science portion of the MontCAS.

Figure 11

Percentage of Students Attending Four Day Week Schools Scoring Proficient and Advanced in Science by Cohort Along with the Total for the State of Montana

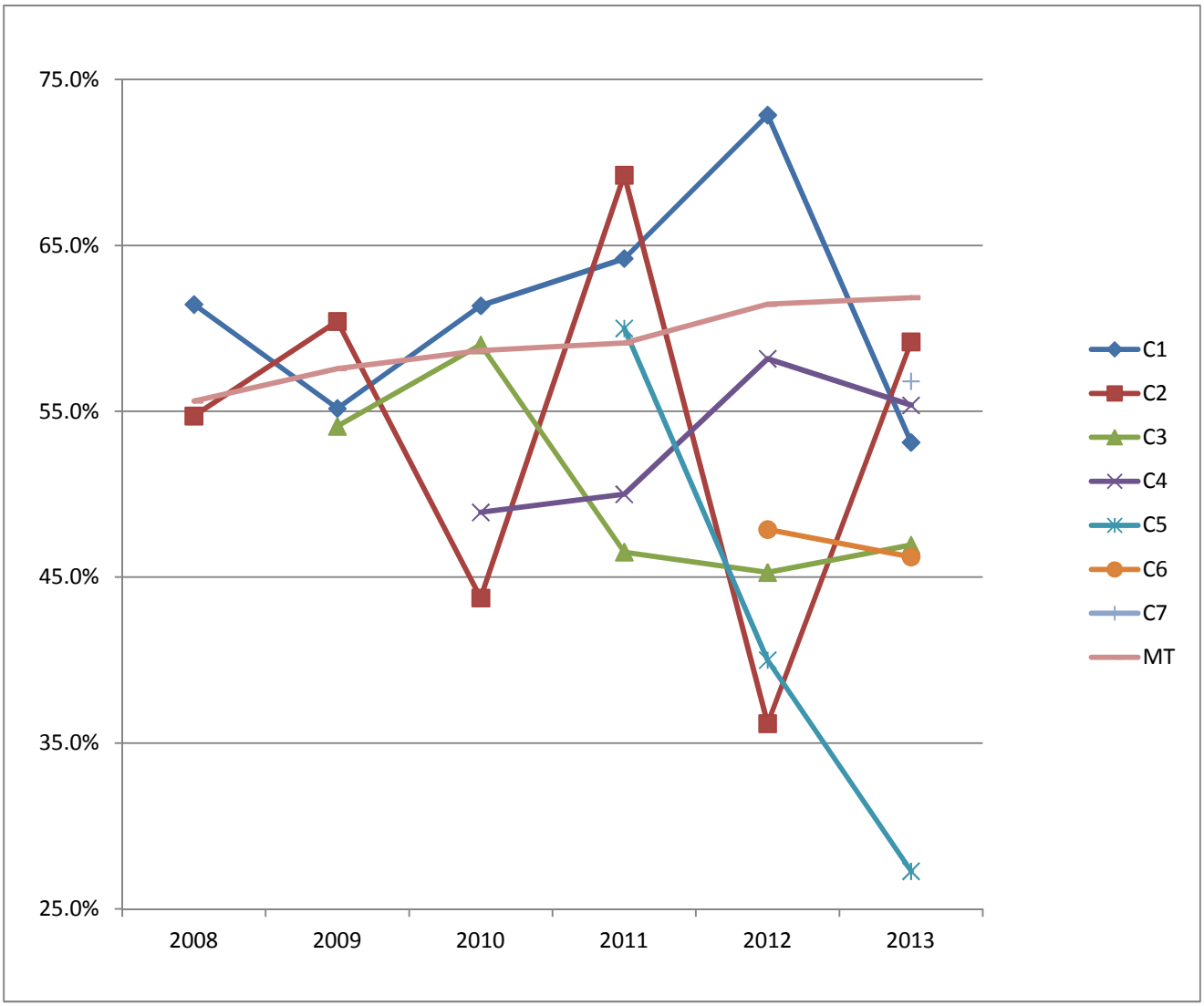


Figure 11 is a graphical representation of the data found in Table 17. There are considerable jumps up and down in the science scores as compared to the math and reading. These fluctuations appear much more level in composite data found in Figures 4 and 7.

Conclusions

The purpose of this non-experimental, quantitative, causal comparative study was to study the relationship between student achievement scores on the MontCAS assessment from schools that used a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of Montana that followed a traditional five day school week. Based upon the student test scores described in this research, it is anticipated that student scores will decline if schools move to a four day schedule. Many administrators who oversee schools that have made the conversion to a four day school week anecdotally report that their test scores have increased. While the first year of a four day school week might result in a temporary increase in scores, the data demonstrates conclusively that this claim does not hold to be true over time. Figures 2, 3, and 4 demonstrate dramatically that even though the early-adopters of the four day school week in Montana out-performed the state averages, in time, nearly every single method of measurement indicated that the students in four day week schools are achieving proficient and advanced on the MontCAS at a lower rate than the rest of Montana's schools.

An even deeper analysis of the data follows in Tables 18-20, where the students in schools that have utilized the four day week for five years or more were considered as their own cohort. The percentage of students scoring proficient and advanced was compared to the state of Montana and the difference calculated. Not only are the students in four day weeks achieving proficient and advanced at a lower rate than the state average, the difference between the student scores in four day week schools compared to the state is growing at an increasing rate.

Table 18

Comparison of Reading Scores in Schools Using the Four Day Week for Over Five Years Compared to the State of Montana and the Difference (Percent Proficient and Advanced)

Year	Four Day Week	State of Montana	Difference
2011	84.2	85.8	-1.6
2012	81.8	87.4	-5.6
2013	78.8	85.2	-6.4

Table 19

Comparison of Mathematics Scores in Schools Using the Four Day Week for Over Five Years Compared to the State of Montana and the Difference (Percent Proficient and Advanced)

Year	Four Day Week	State of Montana	Difference
2011	63.2	68.7	-5.5
2012	57.6	69.3	-11.7
2013	52.9	67.3	-14.4

Table 20

Comparison of Science Scores in Schools Using the Four Day Week for Over Five Years Compared to the State of Montana and the Difference (Percent Proficient and Advanced)

Year	Four Day Week	State of Montana	Difference
2011	56.1	59.1	-3.0
2012	54.1	61.5	-7.4
2013	52.6	61.9	-9.3

Implications for Further Research

The purpose of this dissertation was to study the relationship between student achievement scores on the MontCAS assessment from schools that use a four day school week in Montana to student achievement scores on the MontCAS from schools across the state of

Montana that follow a traditional five day school week. But as discussed in Chapter Two, there are many other anecdotally reported benefits to a school changing to a four day week schedule that could be studied.

One potential study would be an analysis of student-teacher contact time. It has been reported by schools and described by Kordosky (2011) that when teachers and students can schedule doctor appointments and other planned absences on the fifth day of the week, students and teachers are both in school more often. This claim has never been backed up with data.

The phenomenon described above where students in schools using a four day week apparently do better in the early years of implementation and then scores as measured by a criterion referenced test drop off and continue to do so also warrants additional study. This could be described as a derivation of the Hawthorne Effect, which is a bias in research that describes how human subjects being studied alter their behavior due to the fact that they are being studied. As previously noted, not a single school system has changed to a four day week schedule for the benefit of researchers so that they can study the outcomes. But schools that make the change to a four day week are under intense public scrutiny and there is pressure from the community, board of trustees, administration, and teachers to make the new schedule work well. As a result, the increased pressure in the early years that appears to wane could be explained by the fact that public scrutiny drops off when the other concerns about a four day week don't materialize. Study into this phenomenon could be accomplished by doing a longitudinal case study in a school to look precisely at individual classrooms of students and track their individual results over time. This would need to be done in a district of sufficient size so that small student numbers do not skew scores. The difficulty with this would be that such

focused study could influence outcomes as students and teachers try to perform, thus creating an additional Hawthorne Effect while trying to see if one exists.

As described in Chapter Two, many of the schools that have made the conversion to a four day week discovered early on that the financial savings anticipated did not materialize to the degree expected. There is a substantial pool of schools in Montana that have been utilizing the four day school week now for two to eight years and this is a topic that could be studied further and could prove useful for schools considering the change. Simultaneously, there is a new source of school data with the number of school districts in Montana committing to trying a four day week beginning in the fall of 2014.

An additional consideration for additional research would include a study of how Montana's students score on the new Smarter Balanced Assessments (SBAC) that will be implemented beginning with the 2014-2015 school year. This may take another year or two to establish baselines and determinations of what is considered Novice, Nearing Proficient, Proficient, and Advanced as the State of Montana transitions from the MontCAS to the SBAC.

A final implication for further research would be to further disaggregate the data to identify specific school districts that are continually above the state average and determine what they are doing well. It is very likely that these schools may be doing something exceptionally well in the way that they operate under a four day school week schedule that could serve as a model to others.

Implications for Practitioners

The practitioner should be very careful in their analysis and interpretation of the research and conclusions reached in this dissertation. Recall that this is a causal-comparative study that only seeks to determine the differences that already exist between two groups. While the data is

conclusive in the analysis of prior data, it is not necessarily describing a cause and effect relationship. What can be gleaned from this is that a great deal of serious consideration should be given to how a four day week might be implemented, what professional development will be provided for staff, and a strategy to ensure that the decreases in student achievement noted here-in don't get repeated.

Implications for Policy Makers

The policy makers in the Montana education system include local school boards, locally hired administration, the Montana Board of Public Education, the Montana Office of Public Instruction, and the Montana Legislature. These individuals should be similarly cautious to not take the data reported in this research as a reason to unilaterally change board policies, state law or the Montana accreditation standards. As discussed in Implications for Further Research, there must be schools in Montana operating under a four day week that are doing exceptionally well and these schools could be studied further to determine what is working. On the other hand, the reverse could also be true for continually under-performing schools.

Summary

While the reasons for making the change to a four day school week vary from district to district, one constant is that schools that convert to a four day week typically do not change back to a traditional five day per week format as it becomes part of the culture of the district. Another constant is that parents, teachers, administrators, and patrons of schools that convert to a four day week are concerned about student academic performance with the loss of approximately 20% of the days of instruction, even though the hours are made up in the other four days. This concern over academic achievement seems to be overcome in the first two years of implementation as student scores are better than the rest of the state. However, once the four day week becomes

part of the culture, the loss of the days of instruction appears to negatively affect student performance.

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APPENDIX A

Application to Conduct Research on OPI Data

Directions for Application to Conduct Research with Student Level Data

Directions for Application to Conduct Research with Student Level Data Collected by the OPI

Student level data will be released to researchers who complete the Research Proposal Application (Exhibit 6) after the proposal has been approved by the OPI Data Privacy and Security Committee and the Research Project Confidentiality Agreement (Exhibit 7) has been signed by the responsible parties. Researchers who are interested in such an arrangement should comply with the following directions. Those agencies under contract with the OPI must complete and sign the Affidavit of Non-Release of Data for Agents of the OPI or Other Entities (Exhibit 4).

1. Researcher must complete the Research Proposal Application (Exhibit 6) and submit the form to the OPI Measurement and Accountability Division, Office of Public Instruction, PO Box 202501, Helena, Montana 59620-2501.

2. Research proposals received will be reviewed by the OPI Data Privacy and Security Committee. As necessary, the OPI legal staff and program staff from the department most closely connected to the research topic may be included in the review process. Researchers will be informed of the committee's decision about acceptance/rejection of the proposal in as timely a manner as possible.

3. Either at the time of the submission of the documents referred to in item 1, or upon having a research project accepted, the researcher must complete the Research Project Confidentiality Agreement (Exhibit 7) and send it to the OPI Measurement and Accountability Division.

4. Once a proposal is accepted, researchers and the appointed OPI liaison will confer for the purpose of developing an agreement related to objectives, end products, timelines, areas of responsibility, data security arrangements, authorship credit, and costs. This agreement must be signed by the Researcher and approved by the OPI liaison.

5. Once an agreement has been signed, access to data will be granted.

6. Questions about directions or procedures for research may be addressed to the Office of Public Instruction, Measurement and Accountability Division.

Montana
Office of Public Instruction
Denise Juneau, State Superintendent
opi.mt.gov

Research Proposal Application

This form will be used to identify the researcher who requests access to confidential student information.
The completed form should be submitted to the:
OPI Data Privacy and Security Committee, Office of Public Instruction, PO Box 20501, Helena, MT 59620-2501.

Title of Proposed Research Project: Student Achievement in Schools with Four Day Weeks
Research Individual or Organization Name: Timothy W. Tharp--for Doctoral Dissertation
Address: P O Box 144
Name of Primary Researcher: Timothy W. Tharp
Title: Doctoral Student--University of Montana

Phone:	Email:
406-937-2811 (work)	ttharp@sunburst.k12.mt.us

Provide a description of the research to be performed, including the following:

a) the research question(s) to be addressed;
b) potential improvements or benefits to Montana education of answering the questions;
c) the organization sponsoring the research;
d) research timeline;
e) the specific data items that will be requested from the Montana Office of Public Instruction (OPI);
f) other data that will be collected for the research and from whom;
g) how the data will be used and analyzed;[1]
h) how the analysis will be reported and to whom;
i) the names and titles of the professional and support staff who will conduct the research and analysis;[2]
j) the estimated time the data from the OPI will be needed; and
k) a detailed description of how the data will be kept secure, including computer security, physical handling and storage of data, and transportation of data.

This section to be completed by the OPI Data Privacy and Security Committee
Signature: _____ Date: _____

Access Approved: ☐ Access Denied: ☐

[1] Data must only be used for purposes associated with the data collection and analysis specified in this Research Proposal.
[2] Attach research staff VITA.

Montana
Office of Public Instruction
Denise Juneau, State Superintendent
opi.mt.gov

Research Project Confidentiality Agreement

The Montana Office of Public Instruction (OPI) has collected certain data that contain confidential personally-identifiable information; the OPI requires this confidentiality to be protected.

The OPI is willing to make these data available for research and analysis purposes to improve instruction in public elementary and secondary schools, but only if the data are used and protected in accordance with the terms and conditions stated in this Agreement.

Tim Tharp, University of Montana Doctoral Student

(Insert typed name and address of Research Organization)

(Researcher) and the OPI agree as follows:

I. INFORMATION SUBJECT TO THIS AGREEMENT

A. All data containing personally-identifiable information collected by or on behalf of the OPI and provided to the Researcher and all information derived from those data, and all data resulting from merges, matches, or other uses of the data provided by the OPI with other data, are subject to this Agreement and are referred to herein as the "subject data." The subject data under this Agreement may be stated or provided in various forms, including, but not limited, to written or printed documents, computer tapes, diskettes, CD-ROMs, hard copy, or encrypted files.

B. The Researcher may use the subject data only for the purposes stated in the Research Proposal Application attached hereto and made a part of this Agreement (marked as Attachment 1), and is subject to the limitations imposed under the provisions of this Agreement.

II. INDIVIDUALS WHO MAY HAVE ACCESS TO SUBJECT DATA

Researcher agrees to limit and restrict access to the subject data to the following three categories of individuals:

1. The Project Leaders who are in charge of the day-to-day operations of the research and who are the research liaisons with the OPI.

2. The Professional/Technical staff in charge of the research under this Agreement.

3. Support staff including secretaries, typists, computer technicians, etc.; however, these individuals shall be allowed access to the subject data only to the extent necessary to support the research.

III. LIMITATIONS ON DISCLOSURE

A. Researcher shall not use or disclose the subject data for any purpose not expressly stated in the Research Proposal Application approved by the OPI unless the Researcher has obtained advance written approval from the OPI.

B. Researcher may publish the results, analysis, or other information developed as a result of any research based on the subject data made available under this Agreement only in summary or aggregate form, ensuring the identities of individuals included in the subject data are not revealed.

IV. ADMINISTRATIVE REQUIREMENTS

A. The research conducted under this Agreement shall be limited to, and consistent with, the purposes stated in the Research Proposal Application.

B. Notice and training on confidentiality and nondisclosure.

1. Researcher shall notify and train each of its employees who will have access to the subject data of the strict confidentiality of such data, and shall require each of those employees to execute an Affidavit of Non-Release of Data for Agents of OPI, Other Entities or Researchers.

2. Researcher shall maintain each executed Affidavit of Non-Release of Data for Agents of OPI, Other Entities or Researchers at its facility, and shall allow inspection of the same by the OPI upon request.

3. Researcher shall promptly notify the OPI in writing when the access to the subject data by any individual is terminated, giving the name of the individual and the date of the termination.

C. Publications made available to the OPI.

1. Researcher shall provide the OPI a copy of each publication containing information based on the subject data or other data product based on the subject data made available through the OPI.

D. Researcher shall notify the OPI immediately in writing upon receipt of any request or demand for disclosure of the subject data.

E. Researcher shall notify the OPI immediately in writing upon discovering any breach, or suspected breach, of security, or of any disclosure of subject data to an unauthorized party or agency.

V. SECURITY REQUIREMENTS

A. Maintenance of, and access to, the subject data.

1. Researcher shall retain the original version of the subject data at a single location and shall not make a copy or extract of the subject data available to anyone except individuals specified in paragraph II.

2. Researcher shall maintain the subject data (whether maintained on a mainframe facility, central server, personal computer, or in print or other medium materials) in an area with access limited to only authorized personnel. Researcher shall not permit removal of any subject data from the limited access area.

3. Researcher shall ensure access to the subject data maintained in computer files or databases is controlled by password protection. Researcher shall maintain all printouts, diskettes, or other physical products containing individually-identifiable information derived from subject data in locked cabinets, file drawers, or other secure locations when not in use.

4. Researcher shall ensure all printouts, tabulations, and reports are edited to prevent any possible disclosure of personally-identifiable subject data.

5. Researcher shall establish procedures to ensure the subject data cannot be extracted from a computer file or database by unauthorized individuals.

B. Retention of subject data.

1. Researcher shall destroy the subject data, including all copies, when the research that is the subject of this Agreement has been completed or this Agreement terminates, whichever occurs first.

VI. TERMINATION OF THIS AGREEMENT

1. This Agreement shall terminate six months from the date it is signed by the OPI. The Agreement, however, may be extended by written agreement of both of the parties.

2. Any violation of the terms and conditions of this Agreement may result in the immediate revocation of this Agreement by the OPI.

   a. The OPI may initiate revocation of this Agreement by written notice to Researcher indicating the factual basis and grounds of revocation.
   b. Upon receipt of the written notice of revocation, the Researcher shall immediately cease all research activity related to the Agreement until the issue is resolved. The Researcher will have three business days to submit a written Response to the OPI indicating why this Agreement should not be revoked.
   c. The OPI Data Privacy and Security Committee shall decide whether to revoke this Agreement based on all the information available to it. The OPI shall provide written notice of its decision to the Researcher within 10 business days after receipt of the Response. These timeframes may extend for good cause.

SIGNATURE PAGE

By signing below, the individual researcher or official of the Research Organization certifies he or she has the authority to bind the Research Organization to the terms of this Agreement and that the Research Organization has the capability to undertake the commitments in this Agreement.

1. Location at which the subject data will be maintained and analyzed.	
2. Signature of the Individual Researcher or Official of the Research Organization	3. Date October 7, 2013
4. Type/Print Name of Official Tim Tharp	5. E-mail ttharp@sunburst.k12.mt.us
6. Title Doctoral Student--University of Montana	7. Telephone 406-937-2811 (work)
8. Mailing Address	
9. Signature of the Principal Research Analyst	10. Date October 7, 2013
11. Type/Print Name of Principal Research Analyst Tim Tharp	12. E-mail ttharp@sunburst.k12.mt.us
13. Title Doctoral Student--University of Montana	14. Telephone 406-937-2811 (work)
15. Mailing Address	
16. Signature of OPI Research Liaison	17. Date
18. Type/Print Name of OPI Research Liaison	19. E-mail
20. Title	21. Telephone
22. Mailing Address	

APPENDIX B

E-mail from OPI Regarding Confidentiality of Data

Tim Tharp

From: Meredith, Eric [EMeredith@mt.gov]
Sent: Monday, November 04, 2013 2:17 PM
To: Tim Tharp
Subject: RE: Got your call

Tim,

Good news! Everything got the official stamp of approval and so now I can send you the data. There are 3 sheets of data here. The first sheet is the CRT results by school and year for each school with an enrollment of 135 or less. You will see the last column is titled "4day". This designates whether or not the school was on a 4 day school week or not for that school year. The 2nd sheet is the same CRT results but is the statewide results for schools of less than 135 enrollment. The 3rd and final sheet is statewide results, regardless of school size.

Also I think we covered this before when we met, but I will re-iterate it here. This data will have to be destroyed after the completion of your work. Obviously your results don't need to be destroyed, just this data that I am sending you.

I am sending the data through the State of Montana File Transfer Service since that site is secure and this has some student level data in it (small counts). You will need to set up an EPASS account to access the file, which is very easy if you don't already have one. Let me know if you have any problems with EPASS or the File Transfer Service. You will receive a 2nd email with a link to the data.

If you have any questions or concerns let me know. I realize you are probably busy, but you may want to take a quick look at this and make sure it makes sense. I will be away from the office and my email all of next week.

Eric Meredith
Education Data Analyst
Measurement and Accountability Division
Office of Public Instruction
Phone - (406) 444-3642

From: Tim Tharp [mailto:ttharp@sunburst.k12.mt.us]
Sent: Thursday, October 24, 2013 5:02 PM
To: Meredith, Eric
Subject: RE: Got your call

OK, thanks. 3-4 weeks fits about right into my world.

T

From: Meredith, Eric [mailto:EMeredith@mt.gov]
Sent: Thursday, October 24, 2013 4:20 PM
To: Tim Tharp
Subject: RE: Got your call

Well I've pretty much got the data all ready to go, but we have run into a problem. As you know most of these schools are small schools. Our OPI Confidentiality Policy states that if percentages are used, such as in this case, then any percentage that is made up from a cell of 5 or less students must be masked.

APPENDIX C

List of Schools Following a Four Day School Week for Five Years or More

Alberton Elementary

Alberton Junior High

Alberton High School

Birney Elementary

Custer Elementary

Custer Junior High

Custer High School

Greycliff Elementary

Helmville Elementary

Knowlton Elementary

Lennep Elementary

Noxon Elementary

Noxon Junior High

Noxon High School

Ovando Elementary

S H Elementary

Salmon Prairie Elementary

South Stacey Elementary

Spring Creek Elementary

Victor Elementary

Victor Junior High

Victor High School

APPENDIX D

List of Montana Schools Using a Four Day Week Format and the Year Implemented

School	1st Year Implemented		School	1st Year Implemented
Alberton Elementary	2009		North Star Elementary	2013
Alberton Junior High	2009		North Star Junior High	2013
Alberton High School	2009		North Star High School	2013
Alder Elementary	2010		Northside Elementary	2012
Alzeda Elementary	2013		Noxon Elementary	2008
Arlee Elementary	2010		Noxon Junior High	2008
Arlee Junior High	2010		Noxon High School	2008
Arlee High School	2010		Opheim Elementary	2012
Ashland Elementary	2010		Opheim Junior High	2012
Ashland Junior High	2010		Opheim High School	2012
Bear Paw Elementary	2010		Ovando Elementary	2008
Big Stone Colony	2012		Polaris Elementary	2012
Birney Elementary	2007		Potomac Elementary	2013
Bo Peep Elementary (Circle)	2013		Potomac Junior High	2013
Centerville Elementary	2012		Redwater Elementary	2013
Centerville Junior High	2012		Redwater Junior High	2013
Centerville High School	2012		Reed Point Elementary	2013
Circle High School	2013		Reed Point Junior High	2013
Cottonwood Elementary District (Hill County)	2010		Reed Point High School	2013
Custer Elementary	2009		Reichle Elementary	2010
Custer Junior High	2009		Riverview Elementary (Custer County)	2010
Custer High School	2009		Ross Elementary	2012
Dayton School	2012		S H Elementary	2007
Dodson Elementary	2012		S Y Elementary	2009
Dodson Junior High	2012		Saco Elementary	2011
Dodson High School	2012		Saco Junior High	2011
Dutton/Brady Elementary	2013		Saco High School	2011
Dutton/Brady Junior High	2013		Salmon Prairie Elementary	2009
Dutton/Brady High School	2013		Sand Springs Elementary	2012
Fort Shaw Elementary	2013		Sheridan Elementary	2010
Garfield County High School	2013		Sheridan Junior High	2010
Gold Creek Elementary	2010		Sheridan High School	2010
Greycliff Elementary	2009		Shields Valley Elementary	2012
Hays-Lodgepole Junior High	2013		Shields Valley Junior High	2012
Hays-Lodgepole High School	2013		Shields Valley High School	2012
Helmville Elementary	2007		Simms High School	2013
Hinsdale Elementary	2012		South Stacey Elementary	2007

Hinsdale Junior High	2012		Southside Elementary	2012
Hinsdale High School	2012		Spring Creek Elementary (Custer County)	2008
Hot Springs Elementary	2010		Sun River Middle School	2013
Hot Springs Junior High	2010		Sunset Elementary	2010
Hot Springs High School	2010		Turner Elementary School	2012
Jefferson High School	2010		Turner Junior High	2012
Jordan Elementary	2013		Turner High School	2012
Jordan Junior High	2013		Twin Buttes Elementary	2007
Knowlton Elementary	2007		Valley View Elementary (Lake County)	2013
Lennep Elementary	2007		Vaughn Elementary	2013
Lincoln Elementary	2010		Vaughn Junior High	2013
Lincoln Junior High	2010		Victor Elementary	2007
Lincoln High School	2010		Victor Junior High	2007
Lodge Pole Elementary	2013		Victor High School	2007
Melrose Elementary	2012		West Glacier Elementary	2010
Melstone Elementary	2010		Wolf Point Junior High	2012
Melstone Junior High	2010		Wolf Point High School	2012
Melstone High School	2010			